

Machine and Tool **BLUE BOOK**

A DIGEST OF THE METAL WORKING INDUSTRY

APRIL, 1948

THIS MONTH

Honing Cylindrical Parts

Cams . . . Their Production and Application

Handwheel Design

Human Relations Program Increases Sales, Reduces Unit Labor Cost

New Tools, Close Accuracy Produce Mining, Construction Oil Equipment

What's New in Metalworking

Available Literature

Advertisers' Products Index

Index to Advertisers

COMPLETE INDEX ON PAGE 5

A HITCHCOCK PUBLICATION



MARVEL *Metal Cutting* SAWS

Better Machines—Better Blades

Regardless what type hack saw machines and metal-cutting band saw machines you use, MARVEL BLADES will improve performance. There are sound reasons why this is true; practical reasons that are easily understood and demonstrated.

MARVEL High-Speed-Edge Hack Saw Blades, with a genuine high-speed-steel cutting edge integrally welded to a tough alloy steel body, are both fast-cutting and positively unbreakable. This construction permits greatly increased speeds and feeds and faster blade tensioning. Still, they last much longer than ordinary blades.

MARVEL High-Speed-Edge Hole Saws, with this same unbreakable construction and heavy-duty arbors, have the extra strength required for drill press and lathe use... rapidly saw holes from $\frac{1}{8}$ " to $4\frac{1}{2}$ " diameter thru steel of up to $1\frac{1}{2}$ " thickness.

MARVEL Band Saws are of selected quality. They come ready for use, pre-welded to size for each make and model saw. Individually boxed, they are protected against kinking, rusting or damage to teeth!

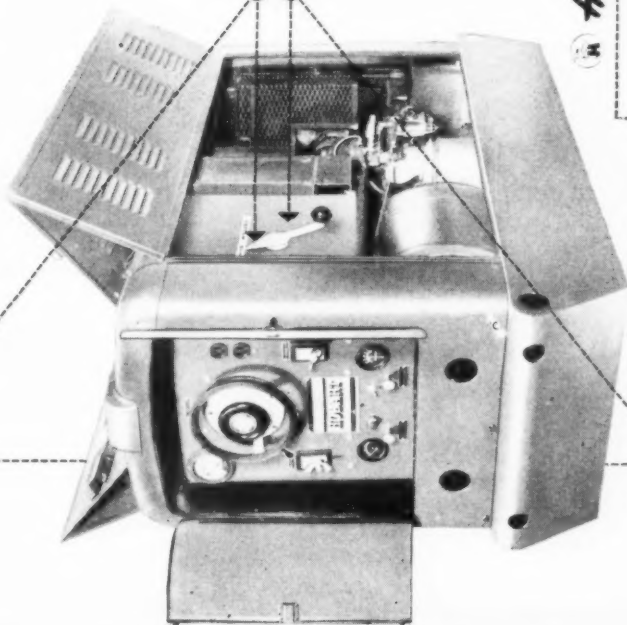
Write for Blade Catalog Sheet.



ARMSTRONG-BLUM MFG. CO.

5700 BLOOMINGDALE AVE. • CHICAGO 29, U. S. A.

A revolutionary A-C Welder and Power Unit



welding a-c current
power a-c current

THE HOBART AC

POWER-WELD

At last, here's a gasoline engine driven machine that will make you completely independent of power lines for producing AC arc welding current and AC power to operate lights, tools and all sorts of electrical equipment. This exclusive Hobart development is the first in the history of arc welding that makes it possible to use alternating current for welding without being tied down to locations where power lines are accessible. Now you can have AC welding current to do Inert Gas Shielded welding in the field.

In addition, it powers all 110 volt AC lights, tools and equipment within its capacity. By merely throwing the switch to "AC Power" you immediately convert this welder to a gas drive power unit to operate lights, electric tools and equipment where no other electric power is available. As an emergency power source, this unit can save you hundreds of dollars in case of normal power failure. Prevents loss of time due to normal power failures—lets you proceed with work and keeps equipment operating as usual. Return the coupon today for specifications on this machine and learn how it can be used profitably on your work.

Hobart BROTHERS CO., box TB-48 TROY, OHIO

"...world's largest builders of arc welders"

HOBART BROTHERS CO., BOX TB-48 TROY, OHIO
Send me detailed information and literature on the new Hobart AC/AC POWER WELD Unit. Also enclosing self-addressed postcard.

NAME

ADDRESS

Mail this Coupon for more information

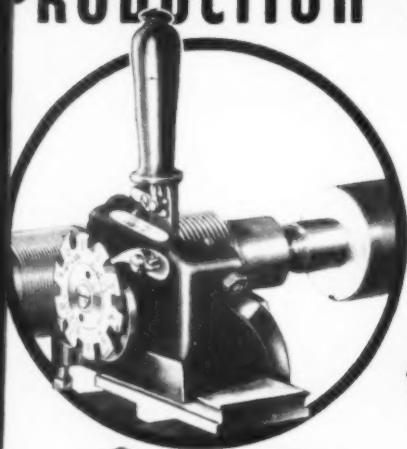
FREE

Send Backer Guide,
List of AC/AC Welders,
Charts, Tables, Etc.



PRODUCTION

Accessories
to Lower
COSTS



THREAD TOOL

Means an easy screw cutting lathe and replace single point thread tools and chasers. Indexing system presents each of ten cutter teeth successively to the work allowing maximum cuts to produce a perfectly formed thread. Duplicate threads without gauging. Write for Bulletin 111

LOCKJAW

New all purpose work clamp eliminates expensive holding operations on millers, planers, grinder and drills. Stops work heaving, shimmying, yawing and buckling with sure-grip, locking pressure forward and downward. Write for Bulletin 14

COLLETS

Lathes, milling machines and other tools can readily be equipped to use Rivett draw-in colls and step checks. This self-centering, convenient method of chucking reduces time and increases precision in tool-room and production work. Write for Bulletin 100.



RIVETT


RIVETT LATHE & GRINDER, Inc.

BRIGHTON • BOSTON • MASS. • U. S. A.

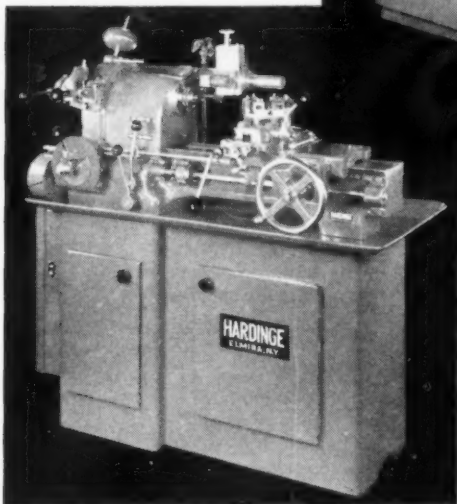
HARDINGE
ELMIRA, N.Y.

**HIGH SPEED
PRECISION
PRODUCTION
MACHINES**



 **SECOND OPERATION MACHINE:** 1" collet, 6" step chuck, 5" jaw chuck capacity; eight spindle speeds to 4000 r.p.m.; preloaded ball bearing construction for spindle and turret; hardened and precision ground steel ways; turret and cross slide operating levers are adjustable to suit the operator.

Write for descriptive bulletin DSM59.



MULTI-OPERATION CHUCKING MACHINE: This machine has the same capacity as the Second Operation Machine. In addition, it has an eight-position turret, production threading head and power feed for the carriage.

Write today for bulletin HP which shows how this machine can handle various jobs, using standard tool bits only... for low-cost tooling.

The production of precision parts today requires tool room accuracy with high speed operation to reduce and then maintain lower costs. The above machines are both designed to increase the output of parts to extremely close tolerance and finish specifications. The precision qualities of these machines, combined with the simplicity of operation, assure lower costs.

HARDINGE BROTHERS, INC., ELMIRA, N. Y.

"PERFORMANCE HAS ESTABLISHED LEADERSHIP FOR HARDINGE"

Offices in principal cities. Export office, 269 Lafayette St., New York 12, N. Y.

When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK

ARMSTRONG

Drop Forged "C" CLAMPS

More Reliable . . .

Every characteristic essential to absolute reliability is built into ARMSTRONG Drop Forged "C" Clamps—maximum strength, extreme stiffness, extra large Tempered and Tested Screws, better "Tool Sense" and design.

That is why it is a good policy to standardize on ARMSTRONG "C" Clamps. . . .

As one of the 9 major ARMSTRONG lines, your local dealer carries ARMSTRONG "C" Clamps in Heavy Duty, "Medium Service," "Extra Deep Throat," "Spatter Resisting" and "Toolmakers" designs, in a wide range of sizes.



ARMSTRONG BROS. TOOL CO. "The Tool Holder People" CHICAGO 30, U.S.A.

NEW YORK • SAN FRANCISCO

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APRIL, 1948

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THIS SAFE LUBRICANT PREVENTS SCORING

use



Anti-Scoring
LUBRICANT

Whether you use it on a center or a tool post screw, you will be convinced CMD Anti-Scoring Lubricant is a safe, sure, economical lubricant to use. It withstands pressures of more than 50,000 pounds per square inch and prevents any metal to metal contact.

Why not send for a test sample today? Your own test will prove it best.



MAIL COUPON FOR FREE SAMPLE

CHICAGO MANUFACTURING & DISTRIBUTING CO.
Dept. 4BB, 1928 West 46th St., Chicago 9, Ill.

Without obligation, please send us a free sample kit of one tube of CMD Center Point Lube and one tube of CMD Center Point Oil. Also, send Catalog describing CMD Helical Groove Centers.

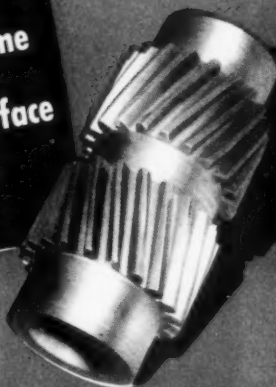
NAME

FIRM NAME

ADDRESS

FULMER *Honing Machines*

✓ Saved 90%
Machining Time
✓ Improved Surface
Finish 900%



ON THIS PART →

for CINCINNATI PLANER COMPANY

This bull pinion, a part used on Cincinnati "Hypro" Planers, is a 4145 forging, having two 6" long bores, in line, $4\frac{1}{4}$ " in diameter. The bores were formerly reamed, removing .005" of metal, with tolerance of .001" in 10 minutes. Surface finish equalled 100 micro-inches. By changing from reaming to honing on a Fulmer Honing Machine, only *one* minute is required to remove .005" of metal to a tolerance of .0002"—and a surface finish of 10 micro-inches is obtained.

This one example is typical of the savings in production time and labor, and the improvement in piece quality that is made possible by Fulmer Honing Machines. If your production involves precision processing of cylindrical bores ranging from $\frac{1}{2}$ " to 30" I. D., investigate Fulmer Machines. Write today, describing your specific work requirements, for complete data on Fulmer Honing Machines adaptable to your production. There is no obligation.

FULMER

C. ALLEN FULMER COMPANY
1242 First National Bank Bldg., Cincinnati, Ohio
PRECISION PRODUCTION EQUIPMENT

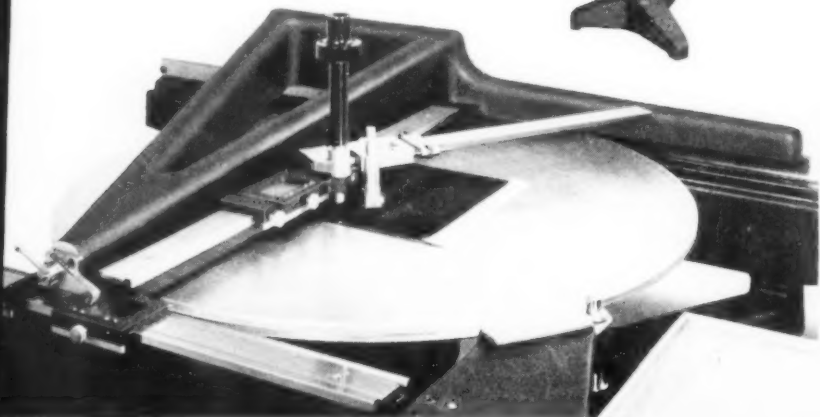
★ Honing Machines • Rod Borers • Piston Ring Lappers

When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK

Left: Bright line drawings, made on the CINCINNATI Layout Scribing Machine, are 20 times size; permit passage of light through the lines.

Below: Close-up of CINCINNATI Layout Scribing Machine. The microscope is mounted on the scriber, and a glass plate has been taped to the swivel plate, preparatory to making a drawing.

Right: CINCINNATI Layout Scribing Machine. The drawings made on this equipment, termed "bright line" drawings, are used in the setup on CINCINNATI Projecto-Form Grinding Machines. Ask for catalog M-1612.



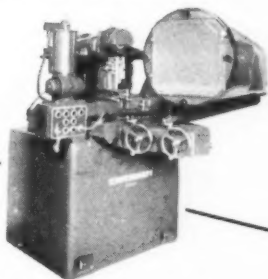
CINCINNATI 9, OHIO, U. S. A.

MILLING MACHINES • CUTTER SHARPENING MACHINES • BROACHING MACHINES

... guardian of Projecto-Form accuracy



CINCINNATI Projecto-Form Grinding Machine, Catalog M-1612.



● Ever hear of a "bright line" drawing? It's a term which will become a familiar byword of accuracy in shops performing profile grinding operations on small form tools and die parts. "Bright line" drawings are made on CINCINNATI Layout Scribing Machines, by accurately cutting away tinted translucent emulsion on a glass plate. Obviously, the lines permit unobstructed passage of light. These drawings are employed in the setup on CINCINNATI Projecto-Form Grinders. ¶ A carbide tipped stylus cuts an accurate line .004" wide. Since the drawing and the image on Projecto-Form's viewing screen are 20 times size, the ground surface of the work—whose image falls within the bright line is accurate within .0002". "Bright line" drawings do the trick. Learn more about this new shop equipment by writing for catalog M-1612.

Get the facts on...

THE

Adjusto

THE SINGLE
BORING BAR
for all your boring

For use on any Boring, Milling, Turret, or Automatic Screw Machine, and designed for practically all boring in manufacturing operations.



For the first time, rigidity in an adjustable bar is assured by ADJUSTO's special-design dovetailed section in the head. This section, operated by #40 ground and hardened screw, slides on ground and polished surfaces thus eliminating inaccuracies caused by wear.

- 1 MICROMETER ADJUSTMENT.....accurate to .0001"
- 2 ANY LENGTH BORE.....up to 21"
- 3 ANY DIAMETER BORE.....up to 16"
- 4 USES STANDARD SQUARE TOOL BITS

Your inquiries welcome—Send for full particulars



Each Adjusto set is packaged in convenient plywood container designed for ease in handling and safe storage.

J-W. SALES CO., INC.
822 FRICK BUILDING
PITTSBURGH 19, PA.



* A Hogging Demonstration

HOGGING!


No shaper hogs off metal without power at the cutting tool or without rigidity or without an overall ability to stand the gaff.

Cincinnati Heavy Duty Shapers, outstanding for many years in power, stamina and sustained performance, are today more powerful and more rigid than before.

The reliable performance of Cincinnati Heavy Duty Shapers means profit in the shop.

Write for catalog N-3 on the complete line of Cincinnati Shapers.

*This Cincinnati Heavy Duty Shaper operated for the 10 days of the Machine Tool Show on a 2" depth of cut, .030" feed, and nine strokes per minute—in 1020 Steel to show the remarkable cutting capacity and rigidity of Cincinnati Shapers.



Watch for our example
of the PROFITABLE
VERSATILITY of
**CINCINNATI
SHAPERS**

THE CINCINNATI SHAPER CO

CINCINNATI 25, OHIO U.S.A.

SHAPERS • SHEARS • BRAKES

Achievements in Precision!



Like the Palomar mirror, Circle R Tungsten Carbide Tipped Circular Saws had to conform to the highest standards and were not offered until this goal was reached.

Circle R Tungsten Carbide Tipped Circular Saws will uphold the prestige that peerless workmanship and continuously fine performance has earned for the nationally known Circle R trade mark. Specifications: 2½" to 10" in dia. 2½" to 4" as thin as 3-64. Special sizes on application. Furnished with both square and radius cutting edges. Tolerance plus or minus .00025.



CIRCULAR TOOL CO., INC.
PROVIDENCE 5, R. I.

Chicago • Philadelphia • New York • Dayton • Cleveland
Los Angeles • Rochester • Indianapolis • Detroit
St. Louis • Minneapolis

GISHOLT TURRET LATHES



**Finger-tip
spindle control
starts, stops, or
reverses the spindle.
Saves time--saves
effort--saves money**



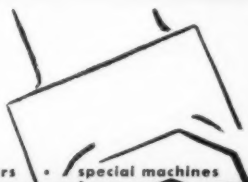
It's power-operated. Clutching
braking are as easy as pres-
s buttons. Instant respos-
cuts time lag, s
up produc

Y MACHINE

COMPANY Madison 3, Wisconsin



The GISHOLT Round Table
represents the collective experience of
specialists in the machining, surface-
finishing, and balancing of round
and partly round parts. Your problems
are welcomed here.



t lathes • automatic lathes • superfinishers • balancers • special machines



TUMICO Tubular Micrometers Quickly and Easily Gage Work Diameters to 96"

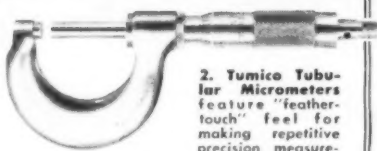
Light Tubular Structure Cuts Operator's Fatigue in Gaging Large Turned Diameters—"Feather-Touch" Feel Insures Precision Measurements.

Precision gaging of work diameters to 96" is both practical and possible with Tumico Tubular Micrometers. Because these micrometers are light in weight, accurate measurements are easily and quickly made on large diameters without tiring the operator. "feather-touch" feel insures precision gaging impossible with heavy solid frame micrometers or calipers. Tumico instruments are designed to reduce measuring time on all types of close work.

MORE TIME SAVING—PROFIT PRODUCING TUMICO PRODUCTS FOR YOUR NEEDS.



1. Tumico Tubular steel Adjustable Limit Snap Gages are up to 50% lighter in weight than solid type units and offer unequalled "feather-touch" feel and balance.



2. Tumico Tubular Micrometers feature "feather-touch" feel for making repetitive precision measurements. They are available in the

Series T fixed anvil type in size 0" to 96" and in Series M mandrel type in sizes from 0" to 106" both in sets or combination. Embodied in these micrometers are such important structural features as hardened and ground spindles, ground and lapped spindle threads, special alloy steel vacuum sealed frames, triple plated with copper, nickel and chrome and easy to read numerals.



3. Tumico Pocket Slide Calipers accurately measure both outside and inside diameters. Deep, clear, calibrations in 32nds and 64ths with latter numbered for rapid reading make these desirable for precision work. Readings in English or metric.

Write Today

—for further information about Tumico Precision Measuring Instruments for all standard and special requirements.

**TRADE
TUMICO
MARK**



4. Tumico Thrift Micrometers are economically priced units having drop forge steel frames, hardened anvils and spindle tips. They are available with ratchet stop and lock ring, or Vernier scale in size 0" to 6".

TUBULAR MICROMETER CO.
ST. JAMES, MINNESOTA, U.S.A. MILWAUKEE BRANCH
PLANKINTON BLDG.



**MODEL 30H MAN-AU-TROL HORIZONTAL LATHE
PRODUCES 3 IDENTICAL PIECES IN LESS TIME
THAN NORMALLY REQUIRED FOR ONE**

For lowering costs on between-center shaft turning work, this new BULLARD Man-Au-Trol machine offers advantages never before found in horizontal lathes.

Identically Toolled Spindles Cut Unit Costs

Three finished pieces per cycle . . . simplified tooling for rough and finish cuts . . . tools cutting almost continuously. As a result the BULLARD Model 30H Lathe not only outproduces three ordinary horizontal lathes but also reduces tooling costs.

Makes Operator's Job Easier

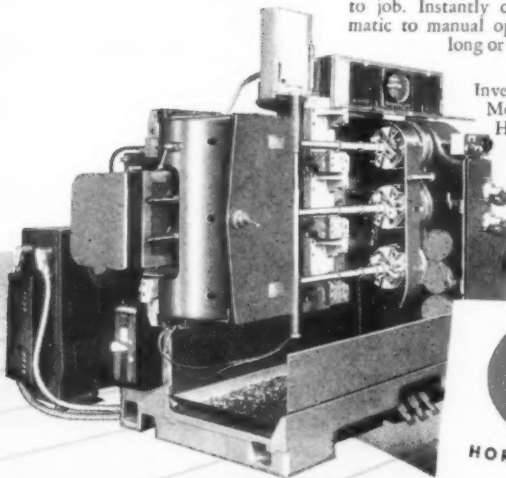
Headstock and all operating controls conveniently located at operator's right. Foot-controlled, hydraulically operated chucks leave operator's hands free. Work and tools always visible, easily accessible. No reaching across tools or tool slide.

An Automatic All-Purpose Machine

Man-Au-Trol, the automatic control that is as versatile as manual control, makes this highly productive lathe an all-purpose machine. Quickly, easily changed from job to job. Instantly convertible from automatic to manual operation. Practical for long or short runs.

Write for Literature

Investigate new BULLARD Model 30H Man-Au-Trol Horizontal Lathe. Complete specifications on request. THE BULLARD COMPANY, Bridgeport 2, Connecticut.



BULLARD CREATES NEW METHODS TO MAKE MACHINES DO MORE





ELGIN

Now Provides Operator Comfort

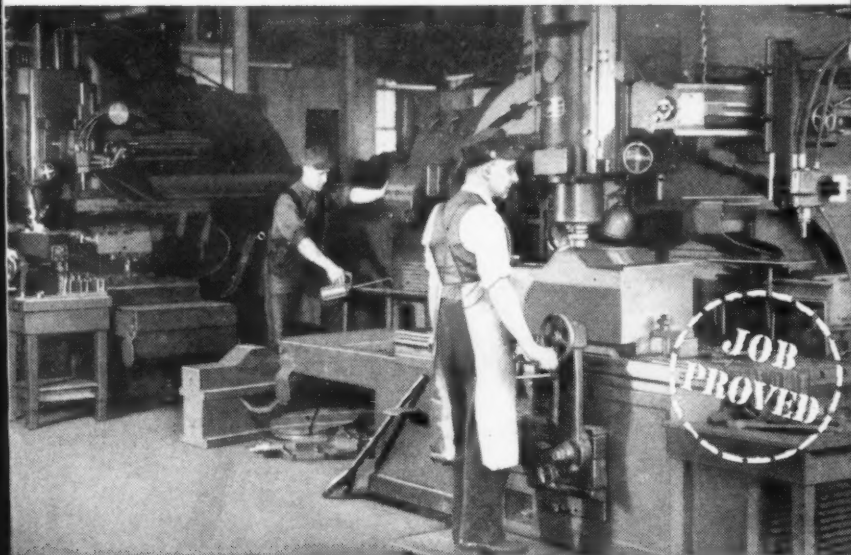
- The "Elgin Line" now is furnished with knee-hole bases with foot rests, permitting operator to sit comfortably, close-up and directly in front of work.
- Motor is mounted in base with direct cross ventilation.
- Three shelves are provided on right hand side.
- Collet board is on left hand door, below the convenient centralized controls.
- Variable speed drive provides stepless spindle speeds from 40 to 4000 rpm.

Write for full details.

ELGIN TOOL WORKS

1772 BERTEAU AT RAVENSWOOD AVE. - CHICAGO, 13 ILL.

Cutting out the "chatter" improves quality



SUNOCO WAY LUBRICANT . . . **Increases Accuracy, Eliminates Need for Extra Grinding**

A manufacturer of steel products was having trouble with the lubrication of five milling machines. The tableways and cross-slide ways were becoming coated with heavy, dark brown deposits which caused severe chattering. An extra grinding operation had to be specified, and many pieces were rejected because of the quality of the machining.

An outstanding performer, Sunoco Way Lubricant, was recommended by the Sun Engineer who was called in for consultation. With this lubricant in use, table chatter was completely eliminated. Better tolerances were obtained. The additional grinding step was no longer necessary.

Quality of the dies that are being milled has been much improved, and the management now states it would not use any other lubricant on these machines.

Increased production and improved quality are typical results in plants where Sun "Job Proved" lubricants are used. In machine shops, in power plants, in quarries, mines, mills and factories, Sun "Job Proved" lubricants help to "produce more for less." For full information on the Sun lubricants for your machines, call the nearest Sun office, or write Department MT4.

SUN OIL COMPANY • Philadelphia 3, Pa.
In Canada: Sun Oil Company, Ltd.,—Toronto and Montreal



INDUSTRIAL PRODUCTS



Multiple Drilling of Plastics

The widespread use of Govro-Nelson Self-Contained Automatic Drilling Units in the drilling of plastic parts is illustrated by the above set-up for drilling 3 holes simultaneously in the shutter-box of the New Whitehouse "BEACON" Camera.

Drilling several holes at once, Govro-Nelson Units make possible not only a greatly increased rate of production but also phenomenal savings in production costs. By simply changing the set-up to alter the number, location or angularity of the holes, the Units can be adapted to a great variety of drilling jobs.

Send for literature giving list of prominent users, together with typical applications covering different types of drilling operations.

WRITE FOR
Literature

GOVRO-NELSON CO.

**1933 Antoinette
Detroit 8, Mich.**

Automatic

DRILLING UNIT



IT TAKES SOMETHING EXTRA TO BE A *Specialist!*

Yes . . . it takes something extra to maintain a modern experimental laboratory . . . constantly testing taps under actual operating conditions!

Technical knowledge and equipment plus a wealth of material on design, heat treatment and performance records of all types and sizes of taps as well as various forms of threads . . . enable us to determine corrective recommendations for longer wear and increased production.

Let us help you with your tap problems . . . see your BATH representative or write direct.

(Transportation is paid to your plant on all Bath products)

JOHN BATH CO.

INCORPORATED

14 Grafton Street
WORCESTER 8, MASS.

GROUND THREAD TAPS • PLUG AND RING THREAD GAGES • INTERNAL MICROMETERS

BROACHING CUTS COSTS FASTER!

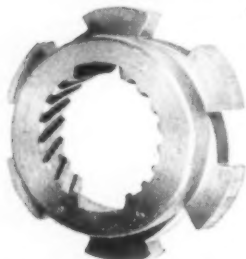


Colonial broaches represent the fastest, surest, precision method there is for removing metal. May be used equally effectively for all kinds of internal or external shapes, regular or irregular.

Wherever they CAN be used, they are bound to give you greater output per machine hour—and that means **REAL SAVINGS**—savings that pay for the tooling cost in a surprisingly short time.

There's a Colonial field representative near you. Ask us to have him figure where and how much *you* can save; how much you can boost your output per machine hour.

-----STEEL-----BRONZE-----COPPER-----



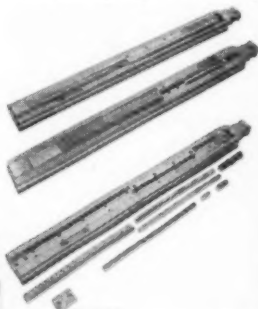
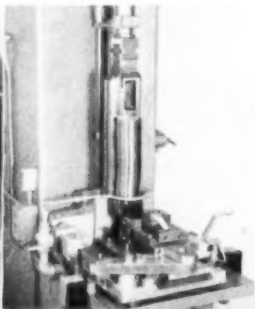
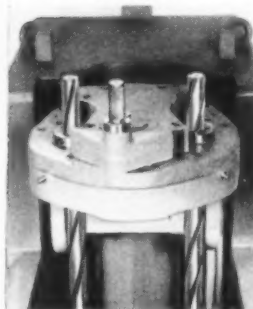
Internal Gears & Splines
in one pass of a broach



Telephone Relay Parts
360 precision parts per hour



Electrical Breaker Arms
900/hour by surface broaching



A NEW COOLANT-

AHCOWET CG

takes the heat off
metal cutting problems



**HIGHER
SPEEDS**



**HEAVIER
CUTS**



**LONGER
TOOL
LIFE**

Ahcowet C G applies a new principle to water emulsions for reducing heat and friction in metal and plastic operations. A product of New England's oldest industrial chemical company. Tested and proven in some of America's largest industrial plants.

SEND FOR INFORMATION

ARNOLD, HOFFMAN & CO., Inc.
Machine Tool Division

55 Canal Street, Providence 1, R. I.

Please send me information about Ahcowet C G

Name _____

Firm _____

Address _____

City and State _____

SIEWEK

FIXTURE CLAMPS AND FITTINGS

IMMEDIATE DELIVERY

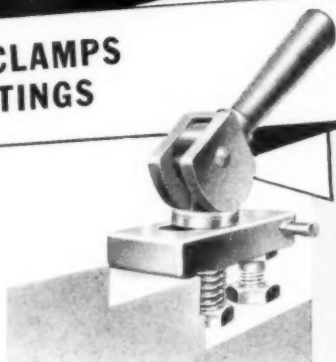
from stock of all Siewek Jigs, Clamps and Fittings is now possible from these strategically located firms:

Paul B. Slater Co., 1025 Santa Fe Ave.,
Los Angeles, Calif.

H. Colby Rowell Co., 2447 Nicollet Ave.,
Minneapolis 4, Minn.

Fink Tool Co., 808 Clinton Avenue, So.,
Rochester 7, New York

H. E. Scholey 2603 North Main Street,
Dayton, Ohio

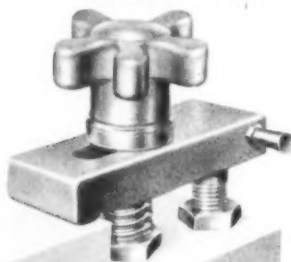


JACK LOCKS, FIXTURE LOCKS, CAMS, KNOBS, REST BUTTONS

Clamp assemblies and other parts necessary for the construction of special fixtures make up this standard Siewek line.

These Clamp assemblies themselves are made in 36 different types, most of them in three sizes. In other words, there is a type and size to meet the requirements of practically all shops.

Write for full size template drawings for use in layout work.



ALSO MANUFACTURERS OF SIEWEK RAPID CLAMPING JIGS & DETAILS

Siewek

TOOL COMPANY

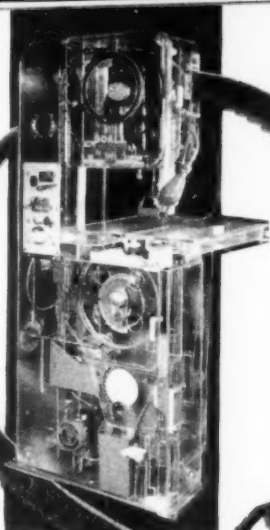
2862 East Grand Boulevard, Detroit, Michigan
Siewek Tool Co., 224 S. Michigan Ave.
BRANCH OFFICE: CHICAGO — Wabash 5509, Chicago 4, Illinois

X-RAY VIEW reveals advanced engineering and finest craftwork of precision mechanism inside the heavy-steel, streamlined case.

SAWS ANYTHING



Alloys
Aluminum
Asbestos
Brass
Bronze
Castings
Ceramics
Copper
Cork
Fabrics
Glass
Iron
Lead
Magnesium
Nickel
Paper
Pipe
Plastics
Plywood
Porcelain
Rubber
Steel
Tile
Tin
Zinc
Wood



**Saw it
with a
DoALL**

WORLD'S FASTEST STOCK-REMOVING PROCESS

Used in all industries to speed up production and slash costs, DoALL Contour Machining starts where ordinary bandsawing stops. Cuts all materials including hardest alloys. "Slices" off stock in minutes—no slow "whittling" to shape. External, internal, straight or curved cuts at any angle. Continuous cutting—no time-wasting backstroke. Smooth power at infinitely variable speeds.

THE RIGHT SAW BLADE FOR EVERY PURPOSE

The right blade on the right machine gives the "teamwork" needed for high production economies. There are many types of DoALL blades: hundreds of sizes in width and pitch; various sets and thicknesses. DoALL-pioneered, patented, "strip-out" blade containers, protect fingers and keep blades undamaged.



C-218

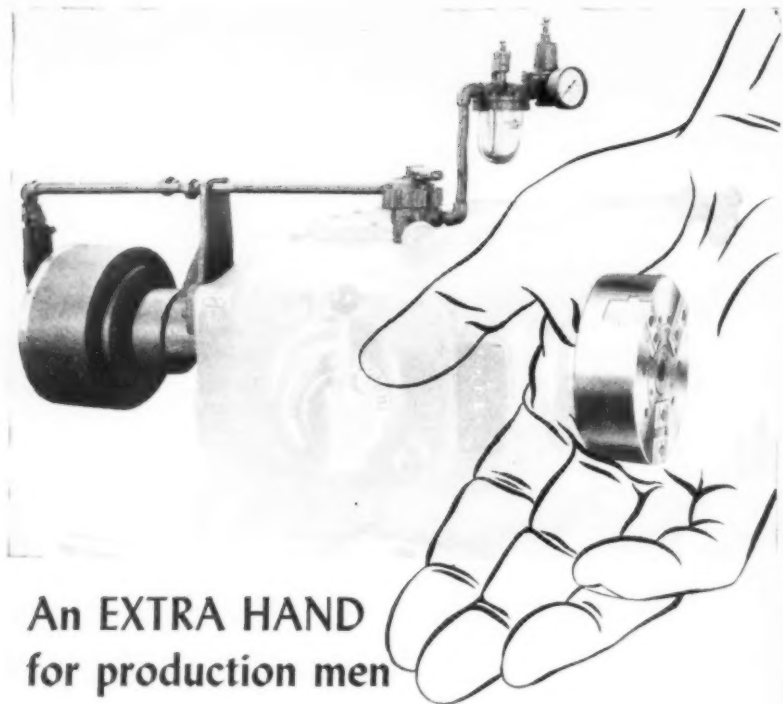
The DoALL Company

REPRESENTATIVES
IN ALL COUNTRIES



DoALL STORES
IN KEY CITIES

Des Plaines, Illinois
Circle Address: DoALL, Des Plaines



An EXTRA HAND for production men

Skinner Power Chucks and power chucking equipment give a production bonus to any turning equipment. In this day of high production, they give a hand where it is needed most.

1. They increase production by reducing the chucking time.
2. They help eliminate operator fatigue.

Production men also appreciate this extra hand—that increases output—that reduces cost.

Skinner Power Chucks, *the simplest Power Chucks made*, have but four moving parts—a wedge and three jaws. This guarantees accuracy throughout a long life and eliminates costly maintenance. The special wedge angle, developed by Skinner, gives tremendous gripping power and unusual safety. *Once a Skinner Power Chuck grips the work, it will not release even if the air is completely cut off! It will hold positively, under the heaviest cuts and highest speeds, until the operator wishes to remove the work piece.*

Complete details on Skinner Power Chucks, rotating and non-rotating air cylinders, valves, filters and all other Skinner chucking and vise equipment are contained in Catalog No. 60. Write for your free copy today.

The Skinner Chuck Co.

341 CHURCH STREET, NEW BRITAIN, CONN.

**Skinner
Chucks**

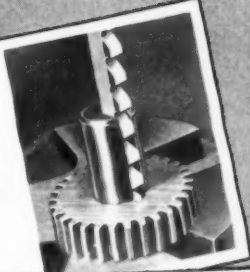


HAND & POWER OPERATED MACHINE CHUCKS - AIR CHUCK EQUIPMENT - FACE PLATE JAWS - MACHINE VISES

**IT'S AS EASY
AS PIE...**



**TO CUT
KEYWAYS,
BY HAND, IN
1 MINUTE!**



**Any Standard Width Keyway,
Any Depth—In GEARS, CUTTERS,
COUPLINGS, COLLARS,
PULLEY HUBS, ETC.**



**with this *Minute Man*
KEYWAY
BROACH
KIT . . .**



**Precision-made and
handsomely cased by**

The du MONT CORP.

**GREENFIELD,
MASSACHUSETTS**

The du Mont Corporation, Greenfield, Mass.

Please mail Descriptive Folder and Price List T together with the name of the Mill
Supply Distributor that can show us the complete range of *Minute Man* Kits.

Company

Address

Name and Position

MAIL THIS COUPON

ACCURACY the EASY WAY...

with the

GEAR MEASURING SYSTEM

Spurs, Helicals, Splines, Serrations-

The Van Keuren Gear Measuring System is generally accepted as the easiest and most accurate method of checking tooth thickness of gears, 30° involute splines and 90° involute serrations. A measurement is made over two opposing wires and this actual measurement is compared with the theoretical measurement over wires for a perfect gear as computed from the Van Keuren tables for 1 diametral pitch gears.

The only equipment required is a set of 2 wires of the proper size for each diametral pitch.

Standard sizes of wires available from stock are:—

1.728"

for external spurs and helicals.

DP
1.44"

for internal spurs and splines

DP
1.92"

for enlarged pinions, 30° involute splines and 90° involute serrations.

DP
1.68"

Alternate series for special requirements.

DP

SIMPLE . . .

For spur gears, involute splines and serrations, the only calculation is one of simple division. For helical gears use the simplified computation forms VK-103, VK-104 or VK-105.

RELIABLE . . .

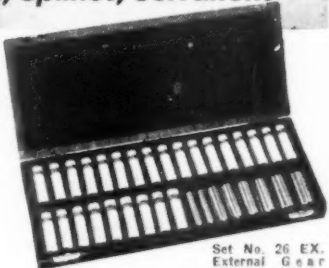
The 1.728" DP System is used by over 90% of American gear producers and users. The 1.44" DP and 1.92" DP systems have been incorporated in standards for involute splines and serrations.

ACCURATE

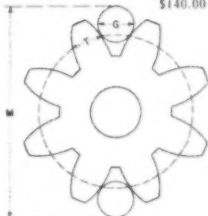
The Van Keuren Gear Tables are complete for gears from 5 to 500 teeth and for pressure angles of 14½°, 17½°, 20°, 25° and 30°. If the measurement over the wires is greater than the value calculated from the tables, the tooth is too thick and the cutter must be fed further into the gear blank. Constants for controlling tooth thickness and backlash to .0001" are given for all pressure angles.

The New 1948 Catalog and Handbook No. 34 is a 208 page volume, which has been in preparation for nearly two years. It contains new and epoch making formulas and tables for the exact measurement of screws and worms and complete tables and formulas for using the Van Keuren gear measuring system.

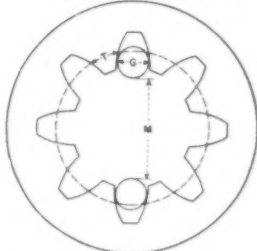
Write for your copy



Set No. 26 EX.
External Gear
Measuring Wires.
\$140.00



EXTERNAL SPUR GEAR



INTERNAL SPUR GEAR



THE **Van Keuren** CO., 177 Waltham Street, Watertown, Mass.

29th YEAR

Light Wave Equipment • Light Wave Micrometers • Gage Blocks • Taper Insert Plug Gages • Wire Type Plug Gages • Measuring Wires • Thread Measuring Wires • Gear Measuring System • Shop Triangles • Carlsby Plug Gages • Carlsby Measuring Wires

**NEW
ADDITIONS**

TO THE BROWN & SHARPE LINE OF PERMANENT MAGNET CHUCKS

NEW SMALL SIZES — NEW FEATURES



NEW! No. 5R Rotary Model

Holds parts from $\frac{3}{4}$ " to 5" in diam. Control ring is operated from any position in which chuck stops.

The specific advantages of these new models, plus all the advantages of other B & S Permanent Magnet Chucks, permit increased efficiency in many operations. For sale only in the United States of America and its Territories.

Brown & Sharpe Mfg. Co., Providence
1, R. I., U. S. A.



NEW! No. 7R Rotary Model

Holds work from $1\frac{3}{16}$ " to 7". Amount operating handle is turned permits variation of holding strength for accurate positioning of work.

NEW! No. 408 Rectangular Model

Has 4" x 8" working surface. Pole spacers closer than on other rectangular models, hold smaller pieces.



NEW! No. 412 Two-Line Rectangular Model

Has 4" x 12" working surface and two line pole spacers. Useful for grinding rows of small parts or larger parts.



We urge buying through the Distributor

BROWN & SHARPE





Jarvis

FLEXIBLE SHAFT MACHINES

DELIVER DEPENDABLE POWER

Manufacturers of quality products know the value of fine power tools and rely on Jarvis Flexible Shaft Machines to do the tough jobs easier, faster and with greater economy. Here, the latest in automotive design is teamed with the ultimate in power tool performance and dependability to produce the manifold pattern of tomorrow's automobile engine. Jarvis Flexible Shaft Machines are available in universal mountings in various hp ratings and speeds for all applications. For best results use Jarvis tungsten carbide rotary files which are ground-from-the-solid. Available in standard sizes in fine, standard or coarse fluting. Descriptive literature on all Jarvis quality power tools available on request.

C. Van Arnen depends on a Jarvis overhead saddle-suspension type machine for a precision finish. Automotive Pattern Company, Detroit, Michigan.

Jarvis

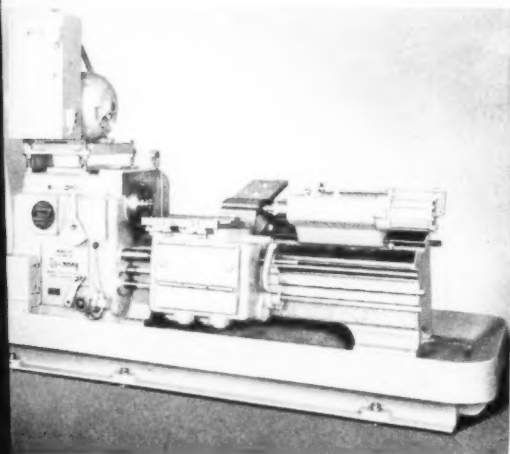
POWER TOOLS

THE CHARLES L. JARVIS CO., MIDDLETOWN IN CONNECTICUT

Tapping Attachments • Tecni-Taps and Dies • Rotary Files
Flexible Shafts and Machines • Quick Change Chucks & Collets

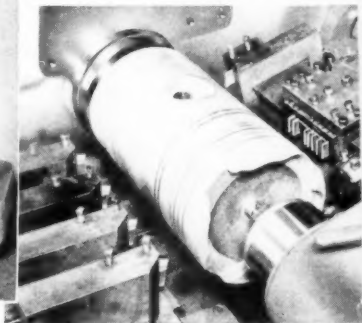
MACHINE OF THE MONTH

PREPARED BY THE SENECA FALLS MACHINE CO. "THE Lo-swing PEOPLE" SENECA FALLS, NEW YORK



Front view of machine without tooling.

Close-up view showing tooling.



Lo-swing MODEL AR LATHE EQUIPPED FOR TURNING DIESEL MOTOR PISTONS

Problem: To automatically turn, groove and finish special alloy pistons having a maximum diameter of 8".

Solution: The Model AR Lo-swing was selected for this job due to its rigidity and "Simplified Change-over Mechanism" which permits changing over from one size piston to another in a few minutes by simply making a few adjustments in gear segments and cam which controls cross slide and rapid traverse movements.

The work is centered on the driven end with an adapter plate machined to fit the bore of the tailstock end of the piston which has been previously machined. This adapter is fitted with a

hardened steel driving plate which contacts a lug cast on the inside piston wall, assuring a positive drive. The piston is supported on the tailstock end with a standard 60° revolving type center.

The turning operation consists of machining the outside diameters with four tools mounted on a single cross slide. The grooving and facing tools are clamped on two independently operated Back Squaring Attachments, the movements of which are synchronized with the front slide.

The end facing tool is mounted in a special relieving type tool block (see close-up view) which automatically relieves the tool on the return stroke, preventing any scoring or marking of the finished face.

Sintered carbide tools are used on this job and a high grade finish is obtained on the ring grooves.

Seneca Falls Engineers are always at your disposal to help find cost cutting solutions for your turning problems.

SENECA FALLS MACHINE CO., SENECA FALLS, N. Y.

PRODUCTION COSTS ARE LOWER WITH Lo-swing

1088 SIZES OF FULLY
FINISHED, READY-TO-USE

BUCKEYE BEARINGS

*CARRIED BY LEADING DISTRIBUTORS
FOR YOUR CONVENIENCE*

● Leading supply houses carry Buckeye Bearings to serve you better. Manufactured from selected materials under our rigid controls, Buckeye Bearings meet the most exacting specifications. Each is a quality product—free from porosity and accurately dimensioned within the required limits assuring speedy, easy assembly and a maximum of long, efficient, satisfactory service. Send for the Buckeye catalog, and order Buckeye quality bearings—by name and number—from your Buckeye distributor.



Buckeye

BRASS AND MANUFACTURING COMPANY

6412 HAWTHORNE AVE



BRONZESMITHS SINCE 1900

CLEVELAND 3, OHIO

**BRONZE SLEEVE BEARINGS • STANDARD SIZES OR TO CUSTOMERS' BLUEPRINT
IN ANY RECOGNIZED BEARING METAL ANALYSIS**

DIE MAKING MADE EASY AT GREATLY REDUCED COSTS

There are TWO WAYS to make dies—
the costly old method—and THE OLIVER WAY
WHICH CUTS COSTS 50 TO 60%—It's easier,
faster and more accurate. You do not need a
skilled mechanic to operate the Oliver.

**OLIVER
OF
ADRIAN**

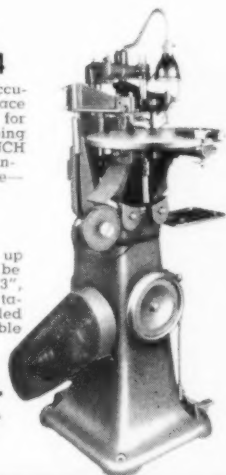
(Above) Oliver Bench Model S-4



THICK . . . 2 speeds, 313 and 428 strokes per minute. The 11" round table tilts to desired angle—STANDARD in most Die shops.

Heavy Duty (Right)

This machine saws, files and laps tool steel up to 3" thick—Sawing up to a 20" circle can be handled with strokes adjustable from 0 to 3", speeds 100 to 350 per minute. The 18" round table tilts to desired angle—Constant controlled pressure feed—The finest die making available for all general purpose tool room work.



IMPROVE YOUR TOOLROOM
IT'S THE BACKBONE
OF PRODUCTION

OLIVER INSTRUMENT CO.
1408 E. MAUMEE ST.
ADRIAN, MICHIGAN

**OLIVER
OF ADRIAN**

AUTOMATIC DRILL GRINDERS
TOOL & CUTTER GRINDERS—DRILL
POINT THINNERS—TEMPLATE
TOOL GRINDERS—FACE MILL
GRINDERS—DIEMAKING MACHINES



VERSATILITY- WITH Finger-Tip CONTROL!



5 quickly interchangeable handpieces types — pencil sizes and larger — some with flexible wrist — see arrow.

FOREDOMS are TOPS "in the small grinder field" Here are 4 REASONS WHY:

1. Extra power and longer motor life because motor not dwarfed to fit hand. 2. Correct handpiece size for deft, sensitive, finger-tip control. 3. Complete range of handpieces types. You fit the tool to job at hand. 4. Small handpiece size lets you get into those "hard-to-reach" places.

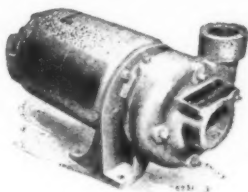
USE FOREDOMS to grind, polish, drill, rout, mill, saw, slot, clean, sand, etch, engrave, etc. FOREDOMS are profitable additions to all departments — production, maintenance, or tool. The FOREDOM line includes "hang-up" models as illustrated and easily-portable bench models. Foot rheostat is standard with most of them. FOREDOMS are still priced at O.P.A. levels.

Our Catalog N-194 gives you valuable information, as to how you can profitably employ FOREDOMS. It will pay you to send for it.

Foredom
FLEXIBLE SHAFT MACHINES
SOLVE MANY PRODUCTION AND MAINTENANCE PROBLEMS

FOREDOM ELECTRIC CO.,
27 Park Place, New York 7, N. Y.
Please send us your catalog N194, showing the different uses of FOREDOM Flexible Shaft Machines.

Name
Address
City & Zone State



KRVS Models D and E



KRVS Model F

There's one to fit your needs

Ingersoll-Rand Coolant and Circulating Pumps are available in various sizes and styles. They are adaptable to any new machine tool or as replacement pumps on machine tools using coolant. They're easy to install, they're compact, and better still . . . they are reliable.



*KRV Models
A and B*

Be sure to specify Ingersoll-Rand when ordering a new pump or replacing an old one. Your nearest I-R branch office or local I-R distributor is at your service.



*KRV
Model C*

Ingersoll-Rand

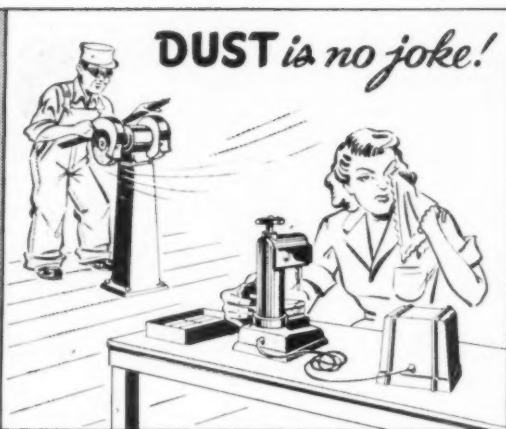
11 BROADWAY, NEW YORK 4, N. Y.

93-9

TORIT

DUST

COLLECTORS



Trap abrasive dust at its source, protect valuable machinery, precision workmanship

In every branch of industry, on all types of equipment, wherever dust is a problem, some 15,000 Torit Dust Collectors are trapping dust at its source and recirculating the cleaned air. Typical of these installations is the one shown below, where a Torit Dust Collector is attached to a surface grinder.

Stock models of Torit Dust Collectors, available for immediate delivery, range in size from $\frac{1}{3}$ to 5 HP. Compact, self-contained and portable, they are adaptable to all production layouts and all types of machines. For details and latest Torit catalog write:

TORIT MFG. CO.

303 Walnut St. • St. Paul 2, Minn.

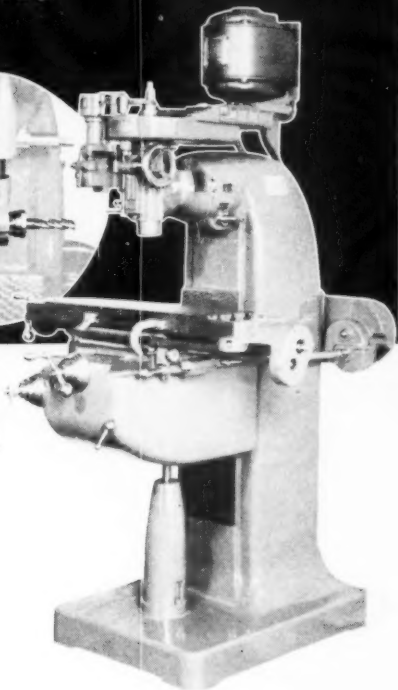
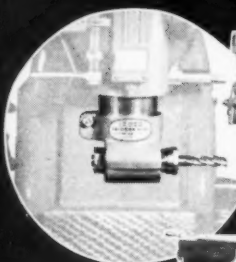


"TORIT takes the DUST from inDUSTry"

Increase Production Range with the **NEW** INDEX MILLING MACHINE

VERTICAL • HORIZONTAL • ANGLE MILLING
BORING • DRILLING

The new Index Angle-Milling Head accurately handles horizontal milling operations of every type including boring and drilling. Change over from vertical to angle milling takes only a few seconds and is done without disturbing the work on the machine table. The attachment can also be used as a cutting arbor or tool holder.



- Automatic Spindle and Table Feed.
- Table Size - 8 x 34".
- Twelve variable cutter speeds up to 2450 rpm.
- Three table speeds can be varied indefinitely.

The Model 55 Index Milling Machine offers a greatly increased range of working capacity over any machine of comparable size to date, plus a substantial saving in production time and labor. The sound engineering and exact construction of the machine makes an extremely rigid unit without deflection or chatter to throw off the accuracy of the work.

A quick change fully-adjustable table feed mechanism delivers power to the table through an oil-lubed feed shaft. The Key-Way of the Lead Screw is eliminated, further adding to the machine's great precision and relative operation. Hand finishing of work is reduced to a minimum.

Other features of the Index Milling Machine include precision ground Lead Screws, Large easy-to-read Angle Dial, Automatic Controls throughout and a full line of accessories.

Send Today for the NEW INDEX CATALOG

INDEX MACHINE Co.

545 N. MECHANIC STREET

JACKSON, MICHIGAN

When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK

60 Pounds of Swarf IN 8 HOURS

REMOVED BY
BARNESDRIL
AUTOMATIC COOLANT
SEPARATOR ON GRIND-
ING OPERATIONS...

Example: Landis Thread Grinder



Machine shut downs for clean out and maintenance are costly and hinder productive output on certain types of operations such as honing, grinding, shaving, and shaping. The accumulation of fine sediment and swarf rapidly plugs coolant lines, seriously effects work finish, and destroys coolant life. Machines on these operations must be shut down frequently to keep them clean and operating efficiently.

BARNESDRIL Automatic Coolant Separators, installed on a battery of Landis Thread Grinders, have eliminated this maintenance problem and increased operating efficiency as much as 90%. A No. 4 Separator is installed on each machine and removes an average of 60 pounds of swarf from each machine every 8 hours. As a result, a constant supply of clean coolant is assured and both direct maintenance costs and valuable production time have been saved.

Capacity of this No. 4 Separator supplies 40 gallons of clean coolant per minute. Other models range from 5 to 100 gallons per minute. Check your requirements for maintenance and sludge removal. A **BARNESDRIL** Automatic Coolant Separator will improve machine performance and efficiency.

Write for Bulletin B 151 A.

BARNES DRILL CO.

222 WESTNUT STREET ROCKFORD, ILLINOIS U.S.A.

Is your cut-off time too high?



**try a
WELLS NO. 8
with wet
cutting system**

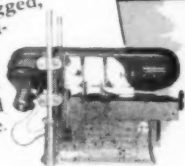
Specifications

CAPACITY: Rounds 8" dia.
 Rectangular 8" x 16"
 With special Guides 5" x 25"
 SPEEDS: Selective 60, 90, 130 ft. per min.
 MOTOR: 1/2 H.P. WEIGHT: Approximate 750 lbs.

WHATEVER the job—rounds, squares, tubing or odd shapes—the Wells No. 8 Metal Cutting Band Saw will hold your cut-off time to a minimum. For production or general utility this saw has the speed, accuracy and versatility to pay for itself. The wet cutting system is an economical extra that makes possible higher cutting speeds and lower operating costs. See your Wells Saw dealer or write for full details.

for HEAVY DUTY jobs the WELLS NO. 12

The Wells No. 12 is a rugged, heavy duty saw with a capacity of 12" x 16" rectangular and 1 3/4" O. D. rounds. It features an automatic cutting cycle and controlled blade pressure.



Wells SAWS

Wells

Products by Wells are Practical

METAL CUTTING BAND SAWS

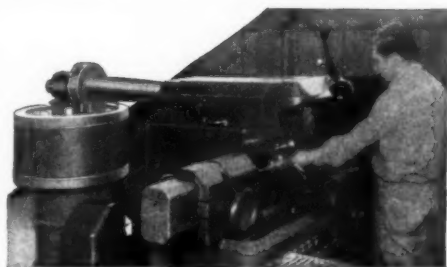
WELLS MANUFACTURING CORPORATION
 707 COOLIDGE AVENUE, THREE RIVERS, MICHIGAN

When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK

STOP DUSTS

With Low Cost Individual
DUSTKOPS

Dustkop Vapor Collectors stop mist and vapor from thread grinders, screw machines with the same low cost efficiency that Dustkop Dust Collectors stop dust and lint from grinding, polishing and buffing. They save heat. They also reduce colds.



AGET-DETROIT COMPANY
205 Main at Washington
ANN ARBOR, MICHIGAN

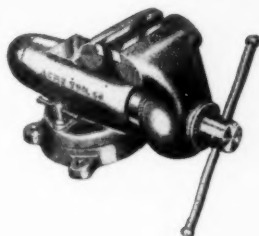
Send For
Catalog A-415
Now.

ACME BENCH VISES for Any Job

You have your choice of 11 Bench Vise sizes — from 2" to 6" wide — Light or Heavy Duty — Interchangeable Ground Jaws.

Combination Pipe and Bench Vises have 4½" jaws — holds pipe from ⅛" to 3½"

By installing Acme Bench Vises Now, you get longer vise life — greater holding power — outstanding performance under hard usage.



. . . Delivery from Stock . . .

Inspect with **CONFIDENCE...**

Use **MEEHANITE METAL TOOLS**



Surface Plates Box Parallels
Slotted Angle Plates
Universal Right Angles
Flat Parallels Lapping Plates
Toolmakers' Knees
Straight Edges

Accuracy of your products depends on the accuracy of Checking Tools. Our tools are built to meet your exacting requirements. Equip your Tool Room, Inspection and Production Departments with these **MEEHANITE METAL TOOLS**.

Surface Plates Rescaped LIKE NEW



ACME TOOL COMPANY
71 W. BROADWAY NEW YORK 7, N. Y.

Bodine

HAS AN APPETITE
FOR *Gadgets*

*... eats
em
up!*

THE versatility, accuracy and high speed of Bodine dial feed machines has been so well demonstrated that many plants requiring repetitive production of small parts, are replacing single process machines with these multiple spindle automatics.

Drilling, Milling, Tapping . . . and screw inserting, if desired . . . are performed during a single cycle of the horizontal indexing dial. A recent tooling for a specific job produced 70 operations per minute (drilling, counterboring, tapping), a result which formerly required several machines and 10 operators instead of one Bodine and one 21 year old girl.

Our engineers will check your blueprints or sample parts and recommend a Bodine tooling set-up that should give you a worthwhile competitive advantage in small parts production.



SEND FOR BULLETIN BB, showing 6 sizes of machines, typical tooling, specifications.

THE
Bodine
CORPORATION
BRIDGEPORT 5, CONNECTICUT

AUTOMATIC DIAL TYPE DRILLING, MILLING,
TAPPING, AND SCREW INSERTING MACHINES

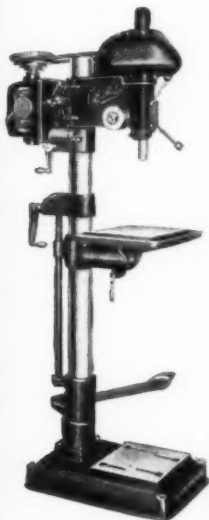
FOR LOWER MANUFACTURING COSTS

RIGID *for* ACCURACY ARRANGED *for* Speed

**MACHINE
TOOLS**

by

"Buffalo"



BUFFALO NO. 18 DRILL

From the heavy 4" diameter column to the sliding head, all parts are heavy-duty and precision-fitted to foster **GREATER ACCURACY** and **LONGER SERVICE**. Drilling with a "Buffalo" No. 18 is **HANDY**, too—all controls intelligently placed where the operator can reach them easily — sliding table and speeds quickly adjustable for real savings in set-up time. The No. "18" will give you "lower cost holes" on jobs up to 1" diameter. Twelve models, bench and floor types, single and multiple spindle. Bulletin 3123-B is yours for the writing.

BUFFALO FORGE COMPANY

161 Mortimer St., Buffalo, N. Y.
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

- ★ BACK SPOT
FACERS
- ★ BAR CUTTERS
- ★ BENDING ROLLS
- ★ BILLET SHEARS
- ★ DOUBLE END
PUNCHES AND SHEARS
- ★ LOCOMOTIVE
SHEARS
- ★ MILL TYPE
SHEARS
- ★ RAPID ACTING
PUNCHES
- ★ SINGLE END
SHEARS
- ★ SPRUE CUTTERS
- ★ STRUCTURAL
IRON WORKERS
- ★ UNIVERSAL
IRON WORKERS
- ★ DRILLS FOR THE
PRODUCTION LINE —
DRILLS FOR THE
TOOL ROOM

CONTINUOUS SERVICE — FASTER OPERATION — PEAK ACCURACY

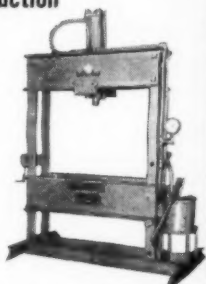
Rodgers SHOP PRESSES

★ Flexible in Performance

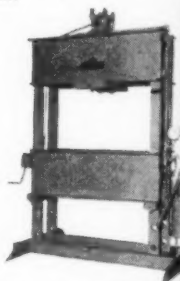
★ Versatile in Use

★ Rugged — Durable in Construction

Illustrated (left) is the Rodgers 150-ton Stationary Shop Press with extra height, equipped with 2-way Travel Cylinder and "D" Pump with 4-way Valve Arrangement.



The Rodgers "Sixty"—60-ton Shop Press (shown above) takes care of those cellaneous jobs that waste so much time and labor. Available with hand operated pumps, or with gear head motor drive, also powered with "D" power unit.



For pressing, squeezing and forcing, there is a Rodgers Press to meet your requirements. These rugged, flexible shop presses are available in 60, 100, 150 and 200 ton sizes. (300 and 400 ton capacity presses are available upon special order). They all embody proved Rodgers design and performance features: Bolster is raised and lowered by a hand crank . . . alloy steel pins can be adjusted to allow desired opening . . . cylinders may be had with one or two way travel in ram travel lengths, from 6" to 14"—frame is of strong, durable rolled steel plate. Power is supplied by hand pumps or power driven pumps.

Save time and labor on your jobs with a Rodgers Shop Press. Prompt delivery on any standard model.

Rodgers 100-ton Stationary Shop Press powered with 4-Speed Hand Operated Hydraulic Pump, also available with "D" pump power unit. Please note that on all presses the cylinder is movable across the entire width of press.

Send for catalog giving complete descriptions, illustrations and specifications of Rodgers Shop Presses.



Shop Press



Crawler-Truck Press

Rodgers Hydraulic, Inc.

HYDRAULIC POWER EQUIPMENT

7453 Walker Street

St. Louis Park, Minneapolis 16, Minn.



Power Pump Unit



Hundreds of large die shops and industrial plants have found ACRO PULLERS indispensable for the grinding, mounting, and fitting of punches. Notice there is no struggle to separate the die set. Acro's Indexed Screw Wrenches* lift the holder axially from the die shoe. The operator raises or lowers the die smoothly, safely, accurately . . . or he may hold it at any desired height. Time saving . . . money making.

Write for details.

*Patented . . . Exclusively Acro.

**SAVE UP TO 50%
OF DIE-MAKING TIME!**

Raise punch holders straight up with no pounding, no prying, no damage to the set . . . no lost time.

Write for interesting details.

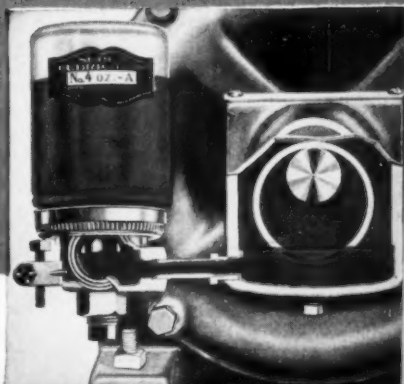
ACRO LUBRICATORS

PREVENT BURNED-OUT MOTORS

Authorities say 85% of all lubricating oils never touch the surface intended! No wonder repairs on 3 out of 4 machines are due to faulty lubrication. Save your equipment with ACRO LUBRICATORS. They feed oil to motor bearings automatically . . . no drippage, no waste, no overflow. Famous for "Dual Visibility"—sight glass shows exact oil level on bearing . . . reservoir shows oil supply. Eliminates guesswork.

Send for Complete Information.

*Another exclusive ACRO design.



ACRO

**PROMPT
DELIVERY**

**METAL STAMPING COMPANY: 332 E. RESERVOIR AVENUE
MILWAUKEE 12, WISCONSIN**



Barker

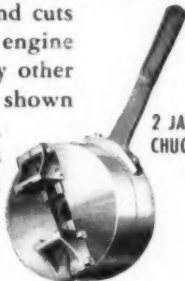
Two-Jaw or Three-Jaw WRENCHLESS CHUCK

will pay for itself in 60 to 90 days on production schedules by giving **MORE** parts per hour at a **LOWER** cost per part. Most round parts can be set in the Barker Wrenchless Chuck without stopping the machine. It saves time, helps speed up production, is simple to operate, reduces operator fatigue and cuts spoilage where the run is continuous on turrets, engine lathes, cutting off machines, drill presses or any other type of chucking machine. The Barker Chuck shown above, replacing an ordinary 3-jaw chuck, jumped production from 18 to 24 pieces per hour. It can do it in *your* plant too. Let us show you how!

3 JAW
CHUCK



2 JAW
CHUCK



Write for bulletin 201 today.

— *Chuck Division*
THOMAS HOIST CO.
24 S. HOYNE CHICAGO 12

✓ on your
Products
✓ in your
plant

use these STANDARD "LOGAN" Components

for your COMPLETE AIR AND HYDRAULIC SYSTEMS

Co-ordinated units designed and built by one manufacturer



AIR AND HYDRAULIC OPERATED CHUCKS

Logan power-operated chucks permit fast, positive, accurate chucking by operating a convenient control valve. Production is profitably increased... idle machine time reduced... operator fatigue minimized. High accuracy and finish are obtained. Constant, equalized jaw pressure with follow-up eliminates spoilage. (Write for Catalog 70-1.)

ROTATING CYLINDERS

These Logan double-acting air and hydraulic cylinders are designed especially for mounting on rotating machine spindles.



NON-ROTATING CYLINDERS

For pushing, lifting, pressing, holding, pulling, clamping and other power movements in any direction. Positive, uniform actuation; high accuracy and speed.



AIR CYLINDERS

Logan air cylinders provide rapid response and maximum power without leakage. Cushioned if desired. (Write for Catalog S-25.)

NEW Rotocast HYDRAULIC CYLINDERS

Clean, true bores in centrifugal cast barrels; 4 automatic-type piston rings. Cushioned if desired. (Write for Catalog 84.)



NEW LOGAN Air-Draulic CYLINDERS



Powered by air; self-contained hydraulic regulating circuit provides controlled feed. Smooth, uniform operation. (Write for Catalog 471.)

SPECIAL MACHINES DESIGNED AND BUILT

Logan

Air and Hydraulic Equipment

LOGANSPORT MACHINE CO., INC.

903 Center Ave.
Logansport
Indiana

SAVES
TIME
EFFORT
MOTION

get

- 1 INCREASED SPEED
- 2 SMOOTHER ACTION
- 3 HIGHER ACCURACY AND IMPROVED FINISH
- 4 SIMPLIFIED CONTROL
- 5 RAPID TRAVERSE AND RETURN
- 6 POSITIVE ACTUATION WITH FOLLOW-UP
- 7 REDUCED SPOILAGE AND SAFER OPERATION
- 8 IMPORTANT SAVINGS IN TIME AND EFFORT

AIR AND HYDRAULIC VALVES

Complete line for hand, foot, electric solenoid, cam, pilot and latch-operated control (Write for air valve Bulletin 371; hydraulic valve Catalog 80, Section 3.)



AIR-OPERATED VISES AND FIXTURES

Quick-acting and accurate... help to increase output, improve precision and reduce costs. Standard vises available. Fixture designed and built to your order. (Write for Catalog S-25.)



HYDRAULIC POWER UNITS

Self-contained units ready for connection to your circuit. Positive, uniform, controlled pressure. Pump, valve and piping are enclosed for protection... all parts readily accessible. (Write for Bulletin 58.)



Collet Grip STEEL TUBE FITTINGS

For permanently leak-proof, vibration proof tube connections. Grip tube without digging... relieve vibration at flare. Can be re-used. (Write for Catalog 44.)



HYDRAULIC AND AIR PRESSES

Standard air-operated arbor presses; standard high and low piston hydraulic presses. Special presses to fit requirements. (Write for Catalog 51.)



NEW Sure-Flow COOLANT PUMPS

Safely handle liquids containing abrasives. Self-priming without submerging types. Splash-proof motor... integral motor drive. (Write for Catalog 62.)



Free ENGINEERING HELP

For designing complete air and hydraulic systems. Layouts furnished. No obligation for this service.



Continental COUNTERBORE SETS

A Size
For Every
Purpose



THE indestructible drive and rigid, yet simple, construction of the Continental Interchangeable Counterbores assure long dependable service.



CONTINENTAL Interchangeable Counterbores are now available in a choice of three sets, each providing a wide variety of useful, dependable tools. In complete yet compact form, you will find a selection designed to fill the needs of the large or small toolroom. Set No. 1 (illustrated), for the small shop, includes cutters up to 1 1/16" diameter, with two holders. Whichever set you choose, you will get fine, precision-made cutting tools.

CONTINENTAL TOOL WORKS

Division of Ex-Cell-O Corporation
DETROIT 6, MICHIGAN



Continental CUTTING TOOLS

- Boring Bars and Tools
- Broaches
- Broach Pullers
- Broaching Fixtures
- Core Drills
- Counterbores and Countersinks
- CTW Drive Holders
- Counterbores (Tool Room Sets)
- Counterbore Pilots
- Inserted Blade Cutters
- Carbide Tipped Cutters
- Form Relieved Cutters
- Milling Cutters
- Thread Milling Cutters
- End Mills
- Side Mills
- High Speed Steel Reamers
- Carbide Tipped Reamers
- Shell Reamers
- Inverted Spottacers
- High Speed Steel Tool Bits
- Carbide Tipped Tool Bits
- Circular Form Tools
- Cut-off Tools
- Flat Form Tools
- Dovetail Form Tools

46-44

This bigger, sturdier band saw
gives more capacity, more accuracy

JOHNSON
metal
cut-off
BAND
SAW

You have the capacity for a wider range of jobs with this 10" high, 18" wide, Johnson. Those extra inches also save you time and trouble on all large jobs—heavy bars, tubes, angles, gang cutting on small stock, etc.

Moreover, higher speeds are possible because of the extreme rigidity of bed, wide guide rolls supporting the blade, and extra large band wheels which minimize bending and twisting stresses on blade. Resultant greater accuracy in cut saves machining time, tools, and metal — and saves saw blades, too.

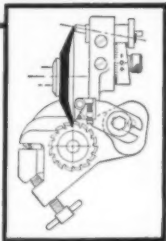
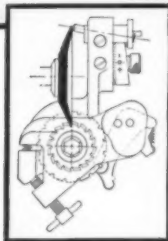
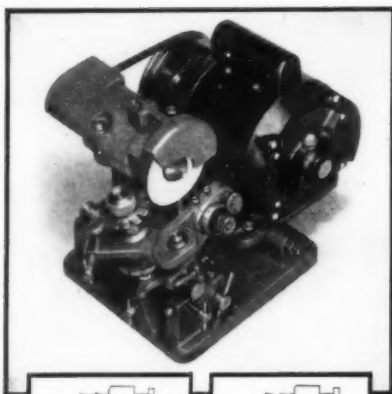


- Automatic, hydraulic feed, quick adjustable from front of machine.
- Quick-setting vise, operated from front of machine.
- Stop for setting work, duplicating length cut-off.
- Four motor speeds. Automatic shut-off at end of cut.
- Made in two types—dry cutting for general work, wet cutting (illustrated) for high production. Both models moderately priced.

WRITE NOW for the descriptive catalog, and the address of the dealer nearest you.



JOHNSON MANUFACTURING CORP.
616 CHRYSLER BLDG.,
NEW YORK 17, N. Y.



Line drawing at left shows index plate construction; right, pawl locating attachment.

WHY be satisfied with costly, inefficient sharpening methods?

Send the coupon for complete information on the most efficient method of sharpening small cutters ever designed.

Please send me complete details on the Waltham Cutter Sharpener. H

NAME _____ TITLE _____

COMPANY _____

STREET _____

CITY _____ STATE _____

WHAT machine do you use to sharpen your small formed cutters?

The small, inexpensive Waltham Cutter Sharpener will save you large, expensive cutter grinders for use on larger-size, usually more expensive cutters.

(Cutters as small as a "dime" to those 3" diameter)

WHERE do you sharpen your small formed cutters?

The Waltham Cutter Sharpener can be placed on any available bench—near your production machines, or in the tool crib. Often saves expensive steps and waiting.

WHO sharpens your small formed cutters?

The Waltham Cutter Sharpener makes sharpening a mechanically controlled operation—permitting skilled and unskilled help to learn quickly to do an accurate sharpening job.

WHEN do you sharpen your small formed cutters?

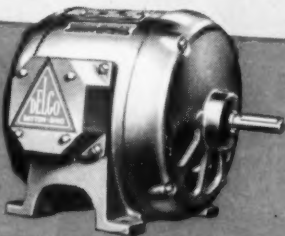
With a Waltham Cutter Sharpener handy, you'll sharpen cutters when you should, that is, *before they get dull* — not wait to cut those costly "few more" that result in accelerated cutter wear and greatly increased sharpening time and cost.

EDWARD BLAKE CO.
634 COMMONWEALTH AVE.
NEWTON CENTRE 59, MASS.

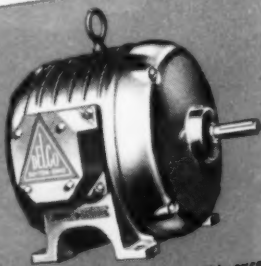
BLAKE TAP GRINDERS—FILTAIRE PORTABLE DUST COLLECTORS—AMERICAN TOOL HOLDERS—BLACK DIAMOND PRECISION DRILL GRINDERS—WALTHAM CUTTER SHARPENERS

DELCO

*The Right Motor
for Each
Requirement!*

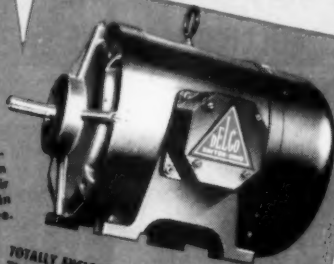


OPEN FRAME BALL BEARING—This frame is compact, rugged, and allows a large volume of cooling air to flow through the motor. The accessibility of all parts makes this type motor popular with maintenance men. It has proved most satisfactory for general popular applications where dust and dirt are not important factors. Now available in frame sizes 203 through 345 inclusive.



TOTALLY ENCLOSED BALL BEARING—This exceptionally strong frame is desirable in locations where dust and dirt in the air cannot be controlled. Now available in frame sizes 203 through 225 inclusive.

For additional information on Delco Motors, write to Delco Products for complete data.

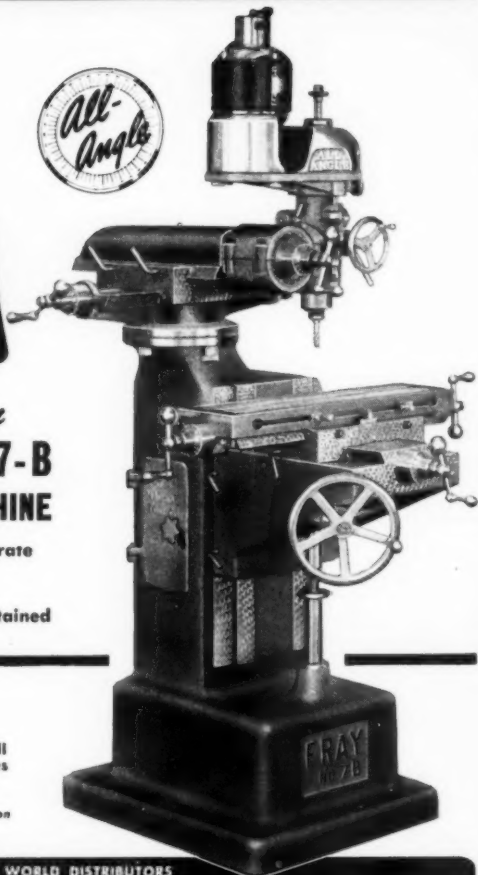


TOTALLY ENCLOSED FAN-COOLED BALL BEARING—The ideal motor frame to protect motor windings and rotating parts in atmosphere laden with injurious particles—iron dust, foundry sand, etc. This type now available in frame sizes 204 through 505 inclusive.



DELCO MOTORS
DIVISION OF GENERAL MOTORS CORPORATION

YOU DON'T HAVE TO STAND ON YOUR HEAD
... to do a difficult job on a
FRAY Miller!



Precision
RAM TYPE NO. 7-B
VERTICAL UNIVERSAL MILLING MACHINE

- Flexible
- Sturdy
- Universal
- Easy to Operate
- One set up
- All angles quickly obtained



- Four sizes
- Four types
- Adaptable to all Milling Machines

For further information
write Dept. C

WORLD DISTRIBUTORS

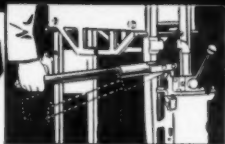
H. LEACH MACHINERY CO.

387 CHARLES STREET

PROVIDENCE 4, R. I.

AGENTS IN ALL PRINCIPAL CITIES

These **KRW** Hydraulic Arbor Press Features...



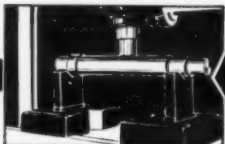
Fast Action, cylinder is filled as ram travels to work. You get tons of pressure with first pump stroke.



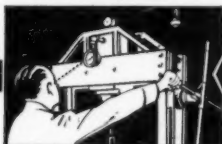
Finger Tip Control opens and closes valve in a jiffy. No gripping effort assures easier, faster operation.



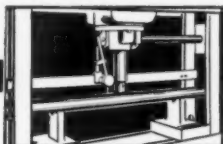
KRW Built-in Mechanical Press permits up to 3 tons pressure for straightening small diameter work.



One Piece, All Steel V-Blocks have machined surfaces for greater accuracy; usable upright or inverted.

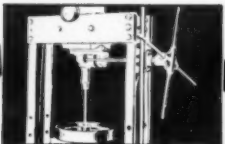


Highly Visible Pressure Gauges are mounted where they can be quickly checked. Read in tons and pounds.

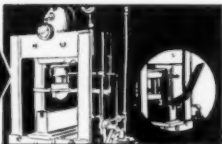


Micrometer Dial Attachment permits great accuracy in checking work without removing from V-block.

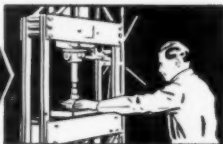
Reduce Costs ON THESE AND OTHER DAILY Production Jobs...



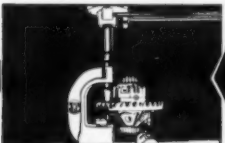
Broaching a key way in a flywheel. 7½ inch ram travel makes many broaching jobs practical on KRW Presses.



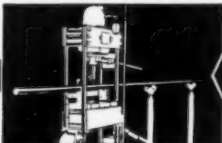
Bending in production lots with simple, inexpensive dies is easily done on low-cost KRW Hand-operated Presses.



Pressing of all types is efficiently handled. Adjustable bed makes pressing on long shafts a very simple operation.



Riveting with KRW Riveting Attachment is simplicity itself. Many KRW Presses are used for this type work.



Straightening, especially on long work, is easy on a KRW Press because of its special open-end construction.



Blanking is easy with simple die set for short-run operations. Releases regular equipment for quantity production.

Write for the
**NEW
KRW**
Catalog.....



K. R. WILSON, 215-217 Main St., Buffalo 3, N. Y.

Please mail me a copy of your
Hydraulic Arbor Press Catalog

13

K·R·WILSON

15 MAIN STREET, BUFFALO 3, N. Y.

Name

Address



Apex Bit Holders do a BIG JOB for LESS

Apex has the *right* bit holder for driving Phillips, Frearson, Slotted, Clutch Head, Socket or Hex Head Screws.

These bit holders do a big job with a minimum inventory. You merely get the bit holders you need (they last indefinitely), then order tips (of whatever types you need), discard the worn out tips and insert new ones.

Holdings accommodate the short,

money-saving bits in a full range of sizes and are furnished for practically all makes of power and spiral drivers.

On hex head screws each replaceable, long-wearing socket has *two* lives. Use one end until it is worn, then turn end for end—and you have a new socket.

Write for Catalog No. 20, which gives complete details.

APEX

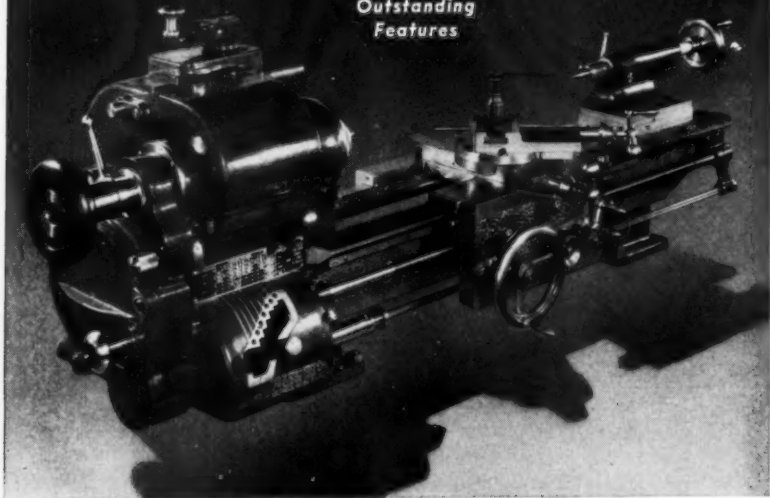
insert type bits

THE APEX MACHINE & TOOL CO., 1029 S. Patterson Blvd., Dayton 2, Ohio

Safety Friction Tapping Chucks; Quick Change and Positive Drive Drill Chucks; Vertical Float Tapping Chucks; Parallel Floating Tool Holders; Power Bits for Phillips, Frearson and Clutch Head Screws; Hand Drivers for Phillips, Frearson, Clutch Head Screws; Aircraft, Industrial Universal Joints; Sockets, Universal Joint Socket Wrenches

It Will Pay You To Check Up On This WADE TOOLMAKERS' PRECISION LATHE

*It Has Many
Outstanding
Features*



Wade

**Bench Lathes and Profilers
For Precision, Versatility
And Stamina**

This No. 8-A Wade Toolmakers' Precision Lathe will meet your every requirement as to precision, versatility and stamina . . . for it is a carefully built lathe with many important features. The spindle has a 1" collet capacity, and is supported in a double row roller bearing, close to the nose. Thrust is taken on a precision ball bearing. The bed is 44", with 8½" swing. It is built on the correct principle of narrow guideways with broad wearing surfaces; it has lasting accuracy and the ability to take the heaviest cuts. The rugged tailstock spindle always has a bearing the full length of the barrel, has a scale graduated in 1/16ths, and a micrometer dial. It has a quick change gear box, and cuts threads as coarse as 6 TPI. Exceptionally close tolerances are possible.

Write today for catalog

THE WADE TOOL COMPANY

51 RIVER STREET • WALTHAM 54, MASS.

DOES A **BIG** FILTERING JOB



EVEN WHERE **SPACE IS LIMITED**



MODEL I 6-15 D
5 to 50 g.p.m.



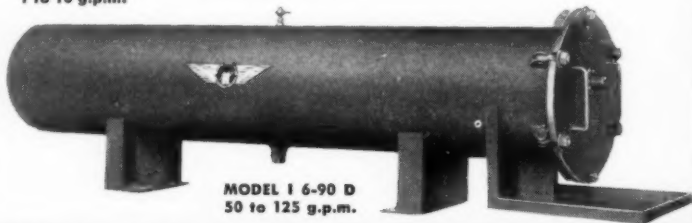
MODEL I 4-15 D
1 to 10 g.p.m.

HOFFMAN Disc Filters

with flow rates up to 125 g.p.m.

Originally designed for aircraft, the Hoffman Disc Filter has been adopted and improved for industrial applications. Thus, you can get continuous flow of clean coolant, even in "cramped quarters". First cost is low . . . no moving parts to get out of order . . . minimum maintenance.

Three sizes of this practical, efficient filter will remove dirt particles measuring from 3 to 5 micro inches. For further details and an estimate of the correct size for your requirements, write today.

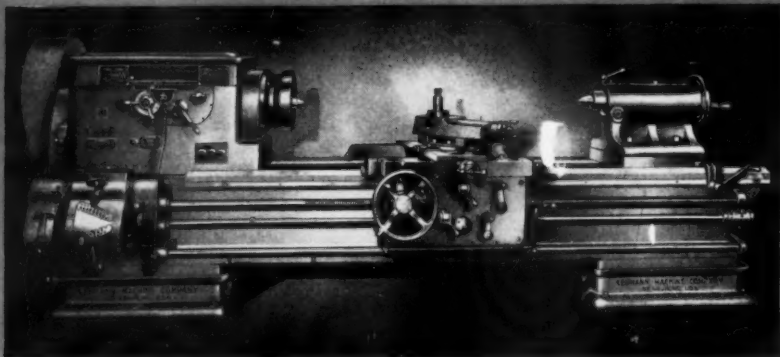


MODEL I 6-90 D
50 to 125 g.p.m.

U. S. HOFFMAN MACHINERY CORPORATION
215 Lamson St., Syracuse, N. Y.
COOLANT FILTERS • FILTRATION ENGINEERING SERVICE



*These 3 Typical Users** **DO IT BETTER ON** **HYDRATROL LATHES** HEAVY DUTY TYPE



*** (FROM LETTERS IN OUR FILES • NAMES ON REQUEST)**



1. "HYDRATROL Lathes have been very satisfactory over a very intensive 3-shift operation for a long time. They have saved us many man hours."

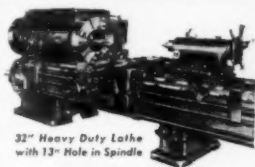


2. "For quite a few years we have had a large number of HYDRATROL Lathes in our shops here. The men working on these machines appreciate the ease of speed control afforded."



3. "HYDRATROL Lathes have been entirely satisfactory for turning high-strength forgings in record time."

Let us show you what a HYDRATROL Lathe could do in your shop. The 30" Standard Type, Heavy Duty lathe shown above, has all the ruggedness and power for the heaviest possible work. Send us prints for a specific recommendation.



32" Heavy Duty Lathe
with 13" Hole in Spindle

LARGE HOLLOW SPINDLE TYPE 4 SIZES - 18" to 36"

Small . . . 18" up to 7 1/8" Hole
Medium . . . 25" up to 12 1/8" Hole
Large . . . 32" up to 16 1/8" Hole
Large . . . 36" up to 16 1/8" Hole
(Standard type lathes, 16" to 36")

L *ehmann* **MACHINE COMPANY**

CHOUTEAU AT GRAND . . . ST. LOUIS 3, MISSOURI

Sunnen Honing

Assures Tool Room Precision



Hardened steel ring gauge—finished to an accuracy of .000025" for roundness and straightness.



Rubber Eraser Extrusion Die "Tripled life of extrusion dies."



Drawing and blanking die "saves time in producing smooth base metal finish."



Shell Loading Die.

Plus

Great Saving of Time

The Sunnen Precision Honing Machine produces a straight round hole, free from bell-mouth and taper, in any steel, carbide, cast iron, bronze—in fact, any metal except lead or babbitt.

Accuracy within .0001" is guaranteed—but this machine is being used to hold tolerances as close as .000025" and to produce a 2 micro-inch finish in hardened steel.

Sunnen Precision Honing is many times faster than lapping. Many users are honing dies and fixtures in 20 to 30% of the time formerly spent on lapping. New developments in abrasives permit producing any degree of surface finish desired.

For fitting dowel pins and ejector pins, for finishing ring gauges, extrusion dies, etc., the Sunnen Precision Honing Machine provides the ideal method of producing precision finishes in the shortest time.

Write for bulletin giving complete information—or we'll gladly send a Sunnen engineer to your plant.

SUNNEN PRODUCTS COMPANY

7935 Manchester Ave., St. Louis 17, Mo.

Canadian Factory: Chatham, Ontario



299



HARD-HITTING 3-POUNDER

New Rotor Scaler makes weld cleaning easy

• The foreman in this fabricating shop says, "This new lightweight Rotor Scaler hits harder and is easier to handle than our former weld-cleaning tools. Its handle is swiveled so you can swing the scaler around at any angle without kinking the hose. And it's easy to step

up the power to suit the job by simply pushing on the throttle handle. It really helps me get out more work."

Call in the Rotor Analyst to demonstrate this new 3-lb. Rotor Scaler *on your work*. Ask for a free copy of Bul. 33.

AIR O'TOOL

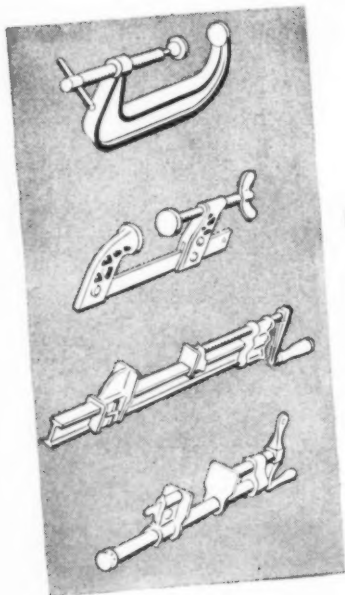


THE ROTOR TOOL CO.

CLEVELAND, OHIO



UNBIASED ANALYSIS OF PORTABLE TOOL PROBLEMS




HARGRAVE
 NO. 530 CARRIAGE CLAMP

No waits; No delays; High-level production now assures fast shipment from stock of top-quality Hargrave No. 530 Carriage Clamps. No other Carriage Clamp on the market offers you so much value. It's a rugged, durable clamp that stands up under extreme pressure. The frame, built of a powerful new metal, is far stronger than malleable . . . proved under **INDIVIDUAL POWER TESTS**. Screw is heat-treated steel to eliminate bending and battered threads. For longer, more satisfactory service specify the Hargrave No. 530 Carriage Clamp.

WRITE FOR CATALOG OF COMPLETE LINE.

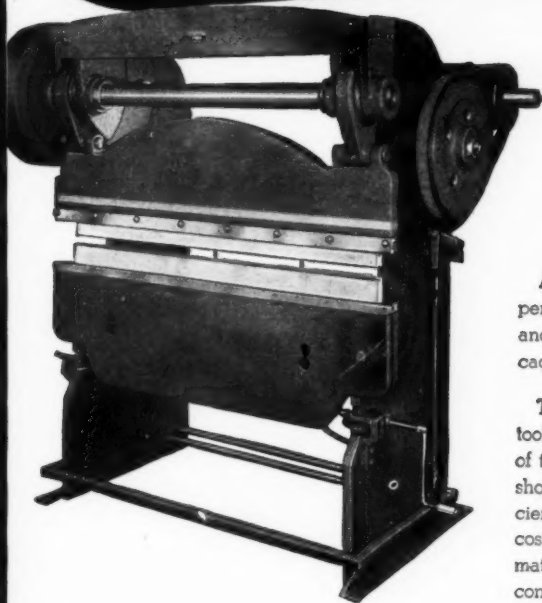
See your nearby Industrial Distributor.


HARGRAVE

1945 Waverly Ave.
Cincinnati 12, Ohio

The Cincinnati Tool Co.

Powerful CHICAGO STEEL PRESS BRAKE



• **TYPE** **"300"** •

A POWERFUL, rugged, inexpensive Press Brake, designed and built to the standards of Chicago Steel Forming Presses.

This money-saving production tool will handle 40 to 50 percent of the work done in an average shop. Greater speed, higher efficiency—much lower operating cost—plus the highest quality material and sturdy steel welded construction as in our larger machines.

We also build special machines for intricate bending operations.

Take advantage of our experience of over 45 years by sending to us any difficult bending problem you have.

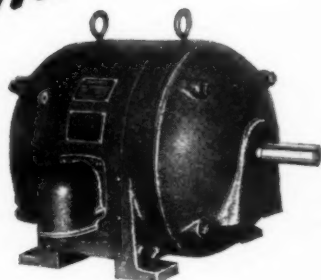
—3 sizes—capacities 10 gage, 4 ft. long; 12 gage, 5 ft. long; 14 gage, 6 ft. long. Powered by 1½ h. p. motor.

WORLD'S LARGEST MANUFACTURER OF HAND BENDING,
POWER BENDING AND POWER PRESS BRAKES

DREIS & KRUMP MANUFACTURING CO.
7440 LOOMIS BLVD. . . CHICAGO 36, ILLINOIS
SEND FOR NEW BOOK "FORMING PRESS DIES AND THEIR USES"



*...You don't have to Baby
a LIMA Motor...*



That's right... you don't have to Baby LIMA Motors.

Type RS illustrated, is ruggedly built for rugged industrial service. LIMA RS motors are especially adaptable to original equipment applications. Their semi-enclosed, drip-proof construction makes them suitable for all types of uses where totally-enclosed motors are not required. Type RS is available in all standard NEMA frame sizes from $\frac{1}{2}$ to 75 hp, for polyphase operation.

LIMA also builds Special Motors... Rotors and Stators in either two or three phase, 25, 50 or 60 cycle, 220/440v AC. Submit your motor problems to LIMA... There is no obligation for our recommendations.

THE LIMA ELECTRIC MOTOR CO.

272 FINDLAY ROAD

LIMA, OHIO

REPRESENTATION IN MOST PRINCIPAL CITIES

LIMA GEARSHIFT DRIVES

LIMA PEDESTAL GRINDERS - LIMA ELECTRIC MOTORS

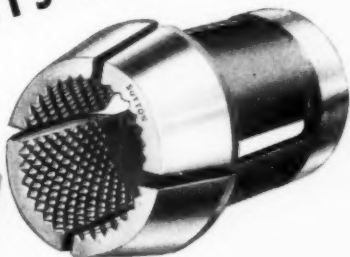


SUTTON



SIGNIFIES
SUPERIOR SERVICE
IN
COLLETS and FEEDERS

DIAMOND GRIP STOPS SLIP



- Supplies quickly and accurately quality collets and feeders that meet your requirements.
- Makes standard and special collets and feeders for all automatics, lathes and milling machines.
- Features diamond serrated collets that grip tighter with less tension — are self-cleaning — reduce spoilage.

"Only Sutton Collets are Diamond Serrated"

SUTTON TOOL COMPANY
STURGIS, MICHIGAN

SUTTON COLLETS

for

ANY SHAPE

... ANY CONTOUR

ANY RADIUS

(INTERNAL, EXTERNAL)

CUT THEM ALL

EASIER, FASTER

with **BARNES**

ARC LINE

BAND SAWS

YOUR contour saw, irrespective of make, is one of the greatest money-saver machine tools developed in recent years. The work this machine is specially designed for—and particularly radius cutting—is most severe on the band saw blade. It is under such conditions that

Barnes Arc-Line Band Saw Blades operating on your contour saw mark the important difference between ordinary performance and **maximum performance**. Correct tooth form, uniform set, proper hardness and temper built into all Barnes saws, plus experience gained through over a quarter century of manufacturing metal saws exclusively, assure you that **maximum performance**.



The Barnes industrial distributor near you has complete stocks of Arc-Line saws sturdily packed in 100-ft. coils. Cut yourself a saw from one of these handy coils and prove to your satisfaction that Barnes Arc-Line delivers maximum performance all ways.



ESTABLISHED 1919

W. O. BARNES CO., INC.

DETROIT 14, MICHIGAN

The CONE AUTOMATIC MACHINE COMPANY



sees many

GOOD THINGS AHEAD

It is reported that

Fitchburg Grinding Machine Corp. has a machine that grinds automobile valves to size at the rate of 2,160 per hour.

get ready with CONE for tomorrow

Small glass globules of exploded glass, similar to popcorn are made by Dant & Russell of Portland, Oregon, and are used to replace sand in plaster.

be ready with CONE for today

Reaction of corn sugar with hydrogen to form sorbitol is accomplished in minutes by the new high-pressure catalytic process of Atlas Powder Co.

get ready with CONE for tomorrow

The new plant of Houston Oxygen Co. will be the first to produce acetylene commercially by the electric "glow" process.

be ready with CONE for today

A library of rubber technology, sponsored by the American Chemical Society, will be set up at the University of Akron.

get ready with CONE for tomorrow

E. I. duPont de Nemours & Co. claims that its new color film "S-T Tripac" can be processed as simply and quickly as black and white.

be ready with CONE for today

The wheels on the new Corlett-Turner bench grinder can be changed in nine seconds.

get ready with CONE for tomorrow

U. S. Rubber Co.'s new automobile cushions can be inflated to any pressure that the passenger likes.

be ready with CONE for today

The new Tournamover straddles an entire building, up to 25 feet, picks it up and moves it to a new location.

Temperatures down to -456° F. are possible with the new helium cryostat developed by Arthur D. Little, Inc.

get ready with CONE for tomorrow

Roughness measurements around internal and external surfaces of rotation can now be made by means of a Rotary Piloting Fixture offered by Physicists Research Co. for use with the Profilometer.

be ready with CONE for today

Anthracite Industries, Inc., announces that its new coal-burning heater is 38% more efficient than ordinary furnaces and will be made in steam, hot water and hot air models for either domestic or commercial use.

FOLLOW THESE PAGES FOR NEWS OF PROGRESSIVE PRODUCTION

Studies at the National Bureau of Standards show that diamonds are highly sensitive to gamma rays and may be used like a Geiger counter.

get ready with CONE for tomorrow

Chance Vought has a contract to build a new fighter plane that will be made almost entirely of their Metalite sandwich material—a balsa and aluminum lamination. Tests show the new material to be lighter and stronger than conventional materials.

be ready with CONE for today

At the Fort Gibson, Oklahoma, dam, ice cubes are being mixed with concrete to cool it before pouring.

get ready with CONE for tomorrow

The incredible speed of 11 million pictures per second has been achieved by a motion picture camera developed at the University of Rochester.

Emphatically Conomatic!

25 1/2" long, 16 operations in 63 seconds from 1 1/2" dia. hot rolled.

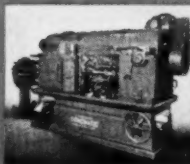


10 1/2" long, 16 operations in 65 seconds from 1 1/4" dia. SAE 4620.



10 1/2" long, 12 operations in 34 seconds from 1 1/2" dia. SAE 3115.

Any good multiple spindle automatic should handle the ordinary run of shaft work. But Conomatics are also adaptable to the unusually tough jobs. The illustrations show this plainly.



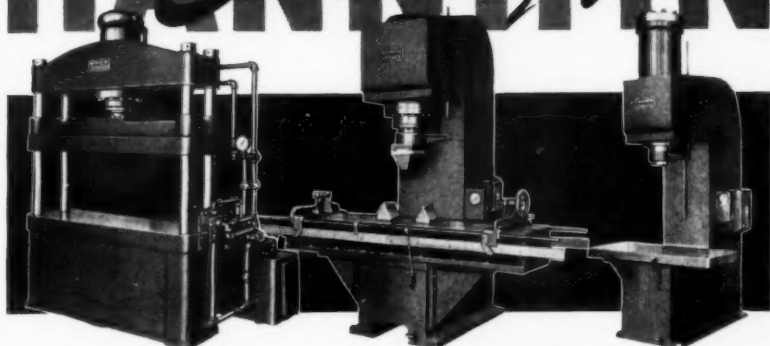
Ask your CONE representative to show you our new color motion picture

CONE

AUTOMATIC MACHINE CO., INC. ★ WINDBOR, VERMONT, U.S.A.

HANNIFIN

Standardized



**SERIES C
COLUMN PRESSES**
48 Standard Models

**SERIES S
STRAIGHTENING PRESSES**
17 Standard Models

**SERIES F
FORCING PRESSES**
10 Standard Models

HYDRAULIC PRESSES

HERE'S help for production men who want presses in a hurry! Hannifin now offers a complete *standardized* line of open gap and column type hydraulic presses in a full range of capacities from 6 to 150 tons. Out of this line, it's easy to select the press you need for forcing, straightening, forming, assembling, broaching, and similar operations requiring fast, accurate production with exceptionally smooth application of pressure. Hannifin gives you everything you want — modern "JOB-TESTED" designs . . . precision-built working parts . . . advanced control features

. . . every operating convenience! Engineering recommendations on request.

NEW BULLETIN

Lists 75 different standard models

● Get your copy of this new catalog! It contains detailed information on the design and construction of Hannifin's Standardized Hydraulic Presses together with specifications and dimensions for 75 different standard model presses. Ask for Bulletin No. 130-Z.



HANNIFIN

*Nationwide
Sales and
Service*

HANNIFIN CORPORATION

1101 So. Kilbourn Ave., Chicago 24, Ill.

AIR CYLINDERS • HYDRAULIC CYLINDERS • HYDRAULIC PRESSES
PNEUMATIC PRESSES • HYDRAULIC RIVETERS • AIR CONTROL VALVES



NO. 1 DIAL COMPARATOR



NO. 211 DIAL INDICATOR

FOR GREATER PRODUCTIVITY

You'll find this AMES No. 1 DIAL COMPARATOR a great aid in meeting your increased production schedules. It's *accurate*, first,—but *ease*, *impersonality*, and *speed* in measuring are also very evident. And they'll all be evident for thousands of readings—contributing low-cost maintenance to low initial cost—giving you highest quality measuring with the greatest possible economy—in dollars, time and human effort.

Ames indicators in any size or dial graduation may be attached. The No. 211 shown is graduated in .0001", has dial reading 0-5-0, and a range of .025"

Specifications

Capacity under contact:	2"	Height, overall:	9 1/2"
Table diameter:	2"	Throat, contact to column:	1 1/2"
		Weight:	4 lbs.

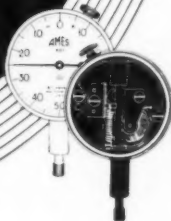
For information on our full line of Comparators and many other measuring instruments, address our Home Office:

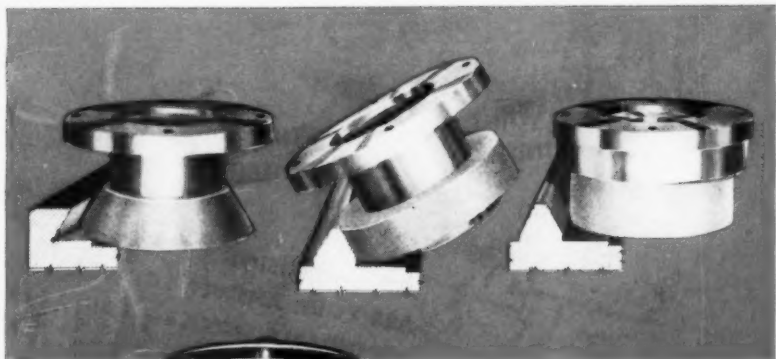
28 Ames Street, Waltham 54, Mass.

B. C. AMES CO.

Mfr. of Micrometer Dial Gauges
Micrometer Dial Indicators

Representatives in
principal cities





Versatile IS THE WORD FOR
THIS **POPE** MOTORIZED
GRINDER SPINDLE . . .

Every user is enthusiastic about the performance of this powerful Spindle with *sealed-in* lubrication and totally enclosed, fan cooled motor. It has the bearing capacity and the rigidity to *rough off surplus metal fast* and produce superior final finishes as well.

As you see, it may be equipped with a wide flange spindle nose for *quick mounting* of various types of grinding wheels or other tools which are readily attached by easy-to-get-at screws. No fumbling around for blind holes.

This useful and popular Spindle comes in 3, 5 and 10 HP, 1200, 1800 and 3600 RPM. Other HP's and speeds are available on special order. Write for Data Sheets 16, 17, 18 and 19.

No. 42

POPE

TRADE MARK REG. U.S. PAT. OFF.

POPE MACHINERY CORPORATION

ESTABLISHED 1920

261 RIVER STREET • MAVERHILL, MASSACHUSETTS

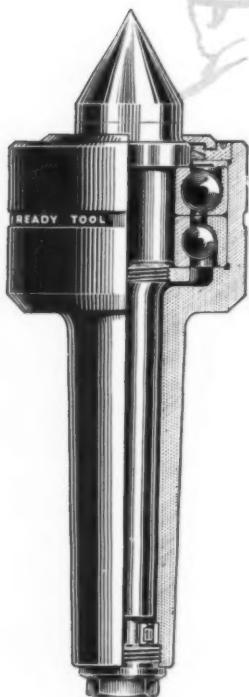
BUILDERS OF PRECISION SPINDLES



**I WANT LIVE CENTERS THAT HOLD UP
UNDER CONTINUOUS PRODUCTION**



**RED-E PRECISION CENTERS
ARE YOUR ANSWER FOR LONG,
DEPENDABLE SERVICE BECAUSE . . .**



... RED-E Precision Ball Bearing Centers are constructed throughout of high carbon chrome nickel steel, heat-treated for added toughness. Shank Type equipped with replaceable high speed steel point... Ball & Roller Bearing and Outside Spindle Types have full diameter high speed steel points, butt-welded to spindles.

RED-E features that assure longer service life . . . cost-per-hour savings!

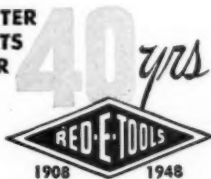
For precision performance, New Departure Duplex Angular Contact Bearings provide definite degree of preload . . . maximum resistance to deflection under heavy radial and thrust loads... accuracy held within .0001" and point zero!

*For detailed engineering facts on RED-E
Ball Bearing CENTERS, write Dept. B.*

THE READY TOOL COMPANY

Bridgeport 5, Conn.

**CENTER
SPECIALISTS
FOR**



6RT46



POSITIVE GRIP!

**Each GLENZER Utility Sleeve
Supplies a Removable Taper
Shank for Many Small Tools**

**SAVE
40%**



**AND
UP**

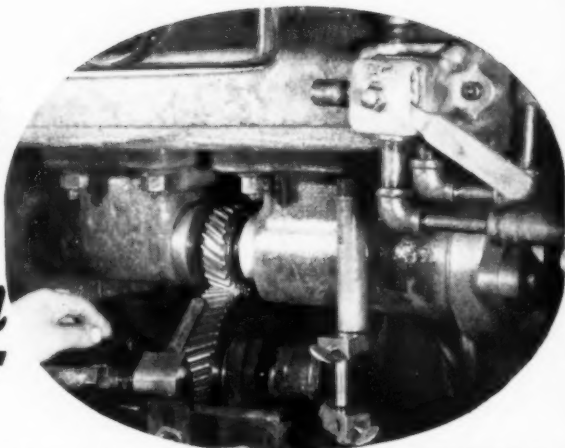
That's why they've been standard in so many plants so many years. Only comparatively inexpensive STRAIGHT SHANK tools are replaced—the Utility Sleeve supplies the taper shank for scores of them before it has to be replaced. The Sleeve, a two-jaw collet in action, fits over the diameter of shank of tool, which is positively driven by flats or tangs on shank end. Thus, your operators get all the speed and convenience of taper shank tools by supplying a positive drive taper shank for *straight* shank tools.

THE J. C. GLENZER CO., Inc.

6465 EPWORTH BLVD.

DETROIT 10, MICH.

*News for
the gear
producer*



**Even faster GEAR SHAVING
with LESS operator EFFORT**



Two operators easily shave 3368 gears in 8 hours on these four Michigan "Underpass" machines equipped with semi-automatic loading.

Shaving of gears for accuracy and quietness is now so inexpensive and fast an operation on the new Michigan 870 machines that the only practical way to cut time and cost still further, is to cut the effort on the part of the operator.

This has been achieved by the provision of semi-automatic loading, now available on all Michigan Gear Finishing Machines.

In one plant, this development on a MICHIGAN "Underpass" finisher has increased production of timing gears from 920 per operator in 8 hours to 1684!!

And the gears are "curved-shaved" (crowned) too, at the same time.

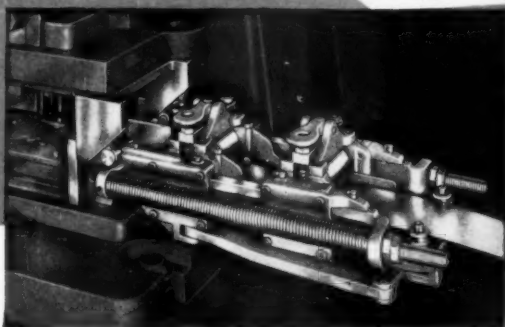
*For the story on this, ask for
"Information Sheet No. 101-1113."*

MICHIGAN TOOL COMPANY
7171 E. McNICHOLS ROAD
DETROIT 12, U. S. A.

Reduce OPERATOR HOURS

up to
90%

with new
Improved



**FITS ANY
PUNCH
PRESS**

DICKERMAN DIE FEEDS

These versatile new DICKERMAN Feeds reduce operator hours 80% to 90% due to their completely automatic operation. They increase production 300% or more because of their rapid accurate action. And they increase die life through the elimination of costly jams and crack-ups.

They are interchangeable—can be mounted on any type punch press and they will feed brass, steel, copper, paper, etc., from any position on the press. No wearing parts. Rugged construction. Many styles, many sizes. **WRITE TODAY.** Send for **FREE Catalog now!**

H. E. DICKERMAN MFG. CO.

321-48 ALBANY STREET • SPRINGFIELD, MASS.

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Syracuse 5-2632 — 5-2639

Waverly 2688

INCREASE YOUR PRODUCTION

with a **KALAMAZOO**
METAL CUTTING
BAND SAW



**MANY
SPECIAL
FEATURES**

If you have a cut-off problem, whether on rods, bars, tubes or odd shapes—investigate the high speed—accuracy—quick set-up and economy of the low cost Kalamazoo Band Saw. 95% of all cut-off jobs come within its capacity. Coolant model (illustrated) permits continuous production.

Ask your dealer or write for bulletin on this **MONEY SAVING TOOL**.

A product of

**MACHINE TOOL DIVISION Kalamazoo Tank & Silo Co.
KALAMAZOO MICHIGAN**



The SAFETY Blades



"LENOX"

Hackmaster

Reg. U. S. Pat. Off.

Made of High Speed Steel

AMERICAN SAW & MFG. CO. SPRINGFIELD 1, MASS.

BREAKAGE ELIMINATED.

Inasmuch as these are non-breakable blades they will withstand hard usage, even misuse, without shattering. Sharp twists and kinks, which are the main reason for saw breakage, are absorbed without damaging these blades.

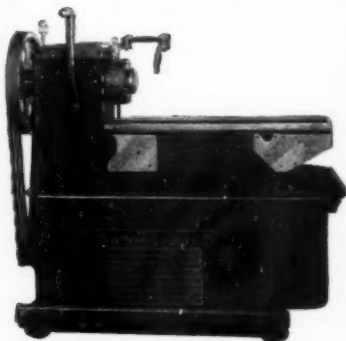
"BASIC UNIT+PARTS" PLAN

Gives you a Specialized Production Lathe at Lowest Cost



ALL-ELECTRIC DRIVE

with rapid speed changing and variable speed drive of 0 to 1500 RPM in either direction.



UTMOST FLEXIBILITY

Above is illustrated the "MINNEAPOLIS" Production Lathe equipped with all-electric variable speed drive. Speed range from 0 to 1500 RPM in either direction provides exactly the speeds needed for any series of machining operations. Any speed desired is instantly obtained with a crank while lathe is running. A dynamic brake operates automatically for quick stopping and reversing.

BASIC LATHE UNIT

with any one of 4 drives: single speed, low speed chain drive, four speed, or all-electric variable speed as shown above. You can then add only the equipment needed for your particular production "set-up".

SMALLER INVESTMENT—Lower Production Cost

The "MINNEAPOLIS" Production Lathe is extremely adaptable to any production set-up, particularly second operation work. Its simplified design and ease of control enable inexperienced operators to turn out high speed volume production.

The "MINNEAPOLIS" has 2 1/4" collet capacity, 14" swing, heavy duty spindle assembly. It is backed by more than 50 years' designing and manufacturing experience. Send for literature — write us your production problems. Send sample part or drawing if possible — let us quote you on a "tailor-made" lathe for your work.

CENTRAL MACHINE WORKS CO.

Machinery Designers and Manufacturers Since 1890

1264 Central Ave. N.E.

Minneapolis 13, Minn.



L-W

SWIVEL BASE MILLING MACHINE VISES

MASTER \$38.00

Jaws: 6½" wide, 2" deep.
Opens 4" with jaws, 5¼" without.
Wt. complete with crank, boxed, 85 lb.

JUNIOR \$28.35

Jaws: 4½" wide, 1¾" deep.
Opens 3" with jaws, 3½" without.
Wt. complete with crank, boxed, 35 lb.

HUSKY 3" \$16.95

Jaws: 3" wide, 1" deep.
Opens 2" with jaws.
Wt. complete with crank, 16 lb.

STEEL JAWS

Suited to drill press and shaper work.

GRADUATED BASE

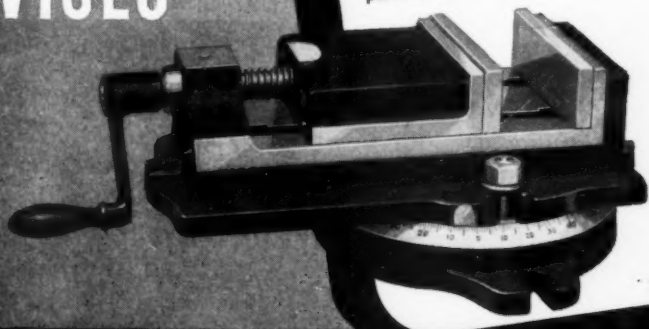
Can be used plain or swivel.

LARGE ACME STEEL SCREW

Contributes sturdiness and durability.

FOUR BOLT AND KEY SLOTS

are provided for rigidly attaching to machine table so that work holding surfaces are at true right angles or parallel to table.



Send for complete catalog giving prices and specifications on these quality, low-cost L-W Products



DEMAGNETIZERS



MAGNETIC CHUCKS



DIVIDING HEADS



RECTIFIERS



DEMAGNETIZING SWITCHES



LATHE CHUCKS



UNIVERSAL CHUCKS



POWER HACK SAWS

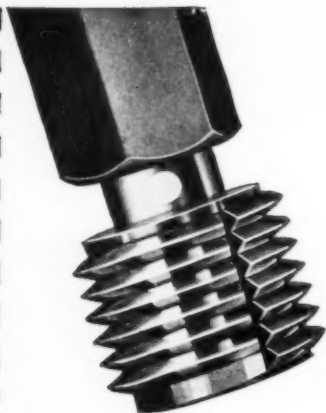


MILLING MACHINE VISES

L-W CHUCK COMPANY 23 SO. ST. CLAIR ST.
TOLEDO 4, OHIO

When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK

There IS a
Difference In Gages!



"Convolution"

... is a process of grinding back the incomplete threads at the ends of the gage, so that the threads will start with a thread which has a full form profile.

The care given this detail in the manufacturing of Republic's thread plug and thread ring gages, eliminates thick end threads, allowing the customer the full working tolerance of the gage and permits the accurate setting of ring gages.

May we serve you?

RELY ON



REPUBLIC

REPUBLIC GAGE

DETROIT 21, MICHIGAN

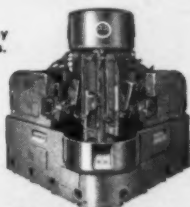
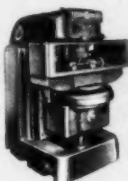
Red Ring Rotary Gear Shaving Machines

FOR SPUR AND HELICAL GEARS



The Elliptoid tooth form may be shaved on these machines.

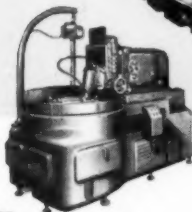
Model GCU DIAGONAL
(2 Sizes) for external gears
from 1" to 12" PD.



Model GCS TURMATIC (2
Sizes) for external gears $\frac{1}{4}$ " to
12" PD.



**Model GCI FINE PITCH
SHAVER** for external
gears $\frac{1}{4}$ " to 4" PD.



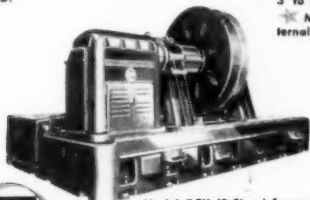
Model GQC
(3 Sizes) for external and internal gears
8" to 48" PD.



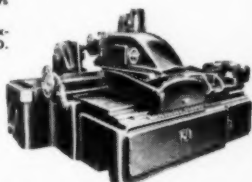
★ **Models GCI** (3 Sizes)
for external gears $\frac{1}{2}$ " to
18" PD and internal gears
3" to 18" PD.



Model GCR for internal gears 3" to 12" PD.



Model GCK (2 Sizes) for ex-
ternal gears 24" to 160" PD.



★ **Model GCI** for external gears 4" to 36" PD.
Model GCM (2 Sizes) for external gears 4" to 48" PD.



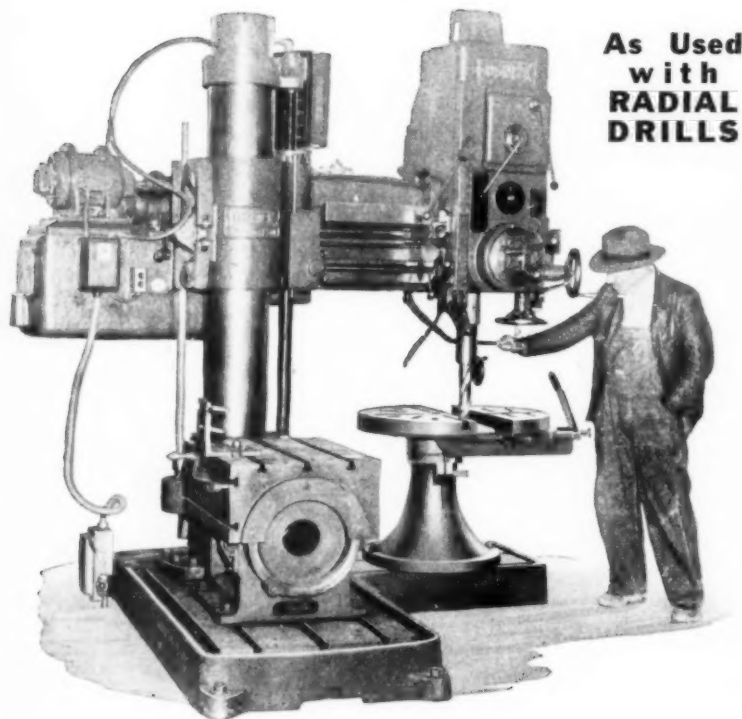
ONE AND HELICAL
GEAR SPECIALLY
ORIGINATOR OF ROTARY SHAVING
AND ELLIPTOID TOOTH FORM

77 for descriptive bulletin on the machine in which you are interested.

NATIONAL BROACH AND MACHINE CO.
3400 ST. JEAN * * * * * DETROIT 13, MICHIGAN

SAFETY DRILL TABLE

Mounted on Pedestal



A time-saving tool that we will be glad to ship you for **FREE TRIAL**. Write for Catalog.

MODERN MACHINE TOOL CO.
Jackson, Michigan



He's DOUBLY- SAFE . . .
Eggs are in TWO baskets
you're just as safe
when you . . .
install

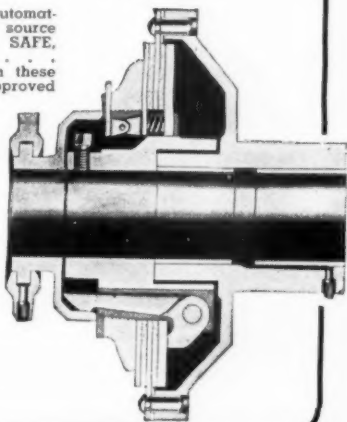
CONWAY CLUTCHES

throughout your plant

SMOOTH flowing, uniform, automatic-
 ally controlled power from source
 to locus of operation . . . **SAFE,**
ECONOMICAL, DEPENDABLE . . .
 that's the short, short story on these
 time-tried, internationally approved
CONWAY CLUTCHES.

- Interchangeable, Standardized Parts
- Precision Built of Basic Materials
- Wide Scope of Horse Power Capacity
- Prompt Deliveries

New bulletin P-25 illustrated
 and filled with mechanical
 information and drawings
 . . . **READY NOW . . .**
WRITE FOR YOUR COPY
 It should be right at your
 elbow.



*Illustrated is phantom view
 of CONWAY DISC CLUTCH*

The Conway Clutch Co.

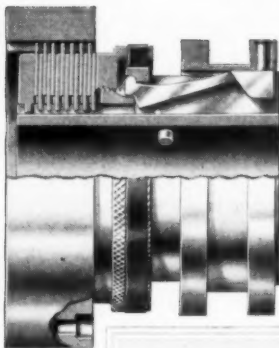
2745 Colerain Avenue

Cincinnati 25, Ohio

MAXITORQ



keeps Good Company!



MAXITORQ Floating Disc Clutches have gained another friend... The Wade Tool Company, Waltham, Mass. Their No. 8A Toolmaker's Precision Lathe uses this modern machine tool clutch in the motor drive so that the headstock spindle can be quickly stopped or started independently of the motor, eliminating the inertia or fly wheel effect of the rotor. Also, the spindle is more easily inched by hand.

The design features of Maxitorq were especially created to solve power transmission problems for builders of machine tools and various types of production machinery. Compactness is outstanding... Separator Springs (patented) keep discs apart (floating) in neutral, to prevent drag, abrasion, heating. The clutch is shipped completely assembled on the body ready to slip onto

a shaft. No tools whatsoever are required to assemble, adjust or take the clutch apart.

Both single and double clutches are standard in 8 sizes to 15 H.P. at 100 r.p.m. . . also in pulley and cut-off coupling types.

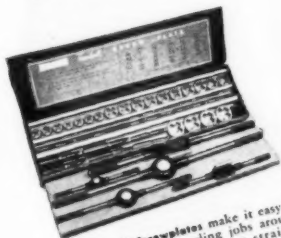
We invite your investigation, confident that the Maxitorq will provide the smooth, trouble-free power transmission you need. Join the growing list of machine manufacturers who "keep good company with Maxitorq."

Send for Catalog No. BB4



THE CARLYLE JOHNSON MACHINE COMPANY
MANCHESTER • CONNECTICUT

THESE THREE Threadwell TOOL SETS WILL SAVE YOU A LOT OF TIME AND MONEY



Threadwell Screwplates make it easy to do all the odd threading jobs around the shop. Anyone can cut straight threads because each die has its own pressed steel guide to keep it lined up right in the stock.
Bulletin No. 432



Threadwell High Speed Counterbore Sets make it easy to counterbore for any size miller head screw or spot face for hexagon heads or square nuts. Two cutting lips with spiral flutes give ample clearance and strength. They cut like a drill, with no chatter. Easily sharpened.
Bulletin No. 433



Threadwell Keyway Cutter Sets make it easy to cut any standard width, any depth keyway in gears, cutters, couplings, pulley hubs, etc. You simply drop in the bushing to fit the bore, insert the cutter and press through. Sixty seconds does the job. Threadwell Arbor Presses have many uses in addition to keyway cutting.
Bulletin No. 434

Write for Bulletins containing complete descriptions and prices of any or all of these quality tool sets.

Sold exclusively by Mill Supply Distributors from warehouse stock throughout the U. S. and the world.

THREADWELL

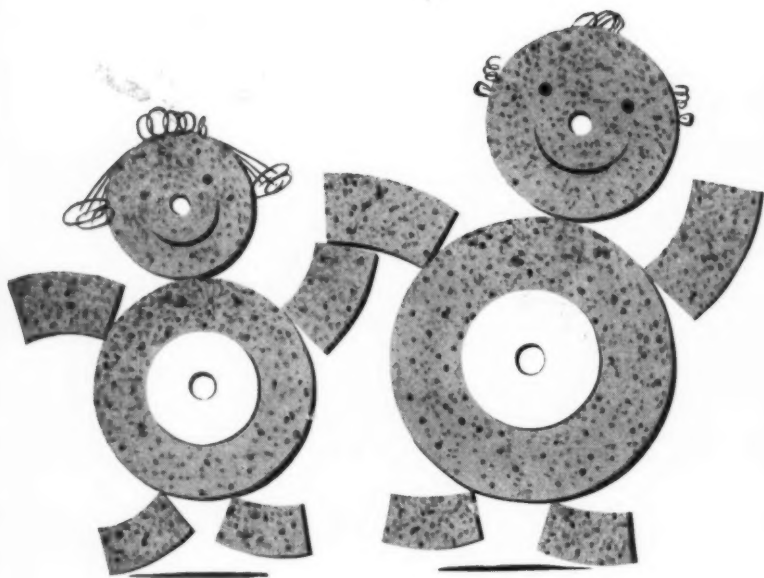
TAP AND DIE COMPANY • GREENFIELD MASSACHUSETTS, U. S. A.

CALIFORNIA OFFICE, THREADWELL TAP & DIE CO. OF CALIF., 1327 SANTA FE AVE., LOS ANGELES 31

Threadwell

"TOOLS OF DISTINCTION"

We're



well-rounded...

Resin-bonded wheels have been added to the Robertson line! Now, Robertson Wheels can handle broadly diversified grinding operations!

The addition of a line of resin-bonded wheels is the logical answer to our desire to give you a complete one-source grinding service.

We asked our engineers to produce a synthetic resin wheel as outstanding as the vitrified "Cool-Cut" and our related vitrified-bonded line . . . and they did it! Robertson Resin-Bonded Wheels can handle the toughest jobs: for instance, billet grinding, grinding in steel foundries, finishing welded products. They're perfect for snagging and cut-off operations, or for any job in which the wheel is subjected to unusual strain. And they're demons for work! Robertson Resin-Bonded Wheels are designed to operate at 9,500 s.f.p.m. on swing-frame and floor grinders. They can operate as high as 16,000 s.f.p.m., provided safety standards are followed. Speeds such as these spell economy where rapid stock removal is a "must."

Remember, for any grinding job, big or small—and especially the tough ones—you'll find the answer to your problem in a Robertson Wheel, whether it's vitrified or resin-bonded.

**ROBERTSON MANUFACTURING COMPANY
TRENTON 5, NEW JERSEY**

Resin-Bonded and Vitrified-Bonded Grinding Wheels, Mounted Wheels, Segments





INCREASED PRODUCTION AT NO EXTRA COST
10 HOURS PRODUCTION IN 8 HOURS WORKING TIME IF YOU USE
A FAST CUTTING MANHATTAN WHEEL ON YOUR PORTABLE TOOL

It is false economy to consider wheel cost alone. The number of production units per wheel is not the only cost factor. More important is the number of units per day! Today's higher cost of man-hours demands increased output. Send for a MANHATTAN field engineer. He will show you how to increase production through the selection of a fast cutting MANHATTAN grinding wheel.

RUBBER BOND

RESINOID BOND

Ask about the new V.D.B. (Vibration Dampener Bushing) Wheel.
 Reduces fatigue and strain on operator.

ABRASIVE WHEEL DEPARTMENT



RAYBESTOS-MANHATTAN INC.

Keep Ahead with Manhattan

MANHATTAN RUBBER DIVISION

PASSAIC, NEW JERSEY

ANGULAR WORK IS SET UP

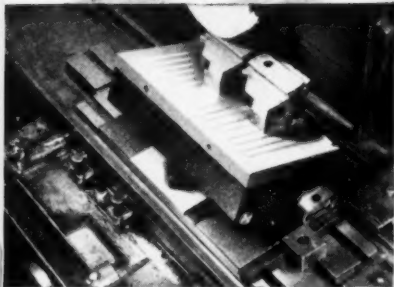
EASIER

FASTER

ACCURATELY

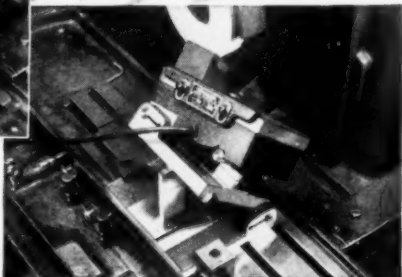
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MAGNA-SINE



↑ The single angle Magna-Sine for straight or single angle work.

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THE *Robbins* INDEX TABLE FOR FAST—ACCURATE PRODUCTION INDEXING

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Roller Bearing Pillow
Block—Cast Iron Body



Roller Bearing Flanged
Pillow Block



Roller Bearing Pillow
Block



Flanged Roller Bearing



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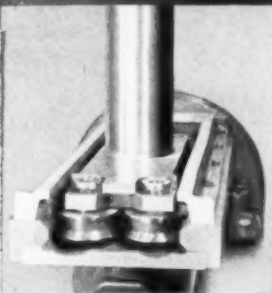


THE *New* **INGERSOLL** *Cutter Grinder*

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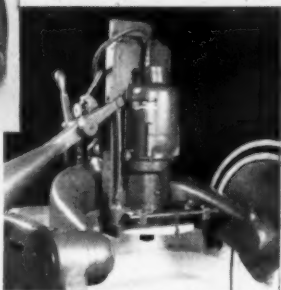
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NEW REPLACEMENT HEAD AVAILABLE FOR OLD GRINDERS →

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• For more details, write for Bulletin 57E describing its wide range of application.



THE INGERSOLL MILLING MACHINE CO., ROCKFORD, ILLINOIS



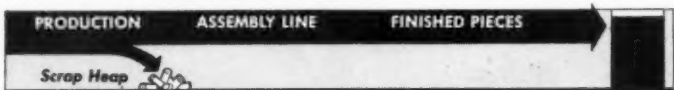
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Old-fashioned gaging methods permit too much scrap loss



Dial Indicator Gaging cuts seconds and rejects to a minimum

For example — as pictured at the right — a Dial Indicator permits gaging while grinding, makes possible continuous precision measurement without stopping the machine. This prevents out-of-round, oversize and undersize pieces — reduces inspection time — saves the time formerly needed for resetting sizing controls after wheel dressing. The Arnold Gage, with various accessories, accurately gages outside diameter, inside or outside widths between faces of shoulders, tapered diameters, and work having splines and keyways. For full details, please write for illustrated Bulletin No. 15



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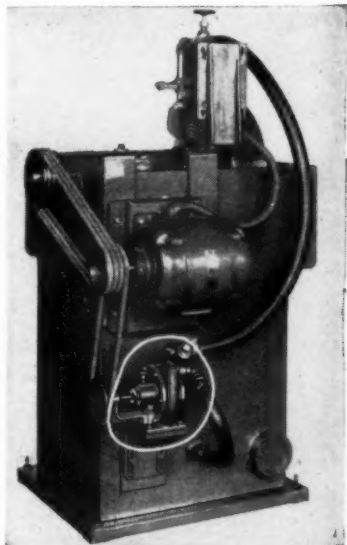
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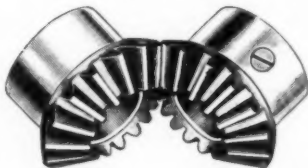
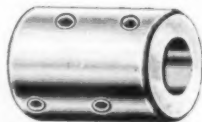
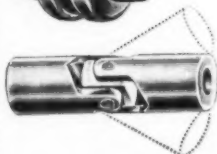
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For complete information write for CATALOG No. 46



Chicago DIE CASTING MFG. COMPANY
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Reaming

accurate, straight, round holes

With
**BARBER-COLMAN
CARBIDE TIPPED
REAMERS**

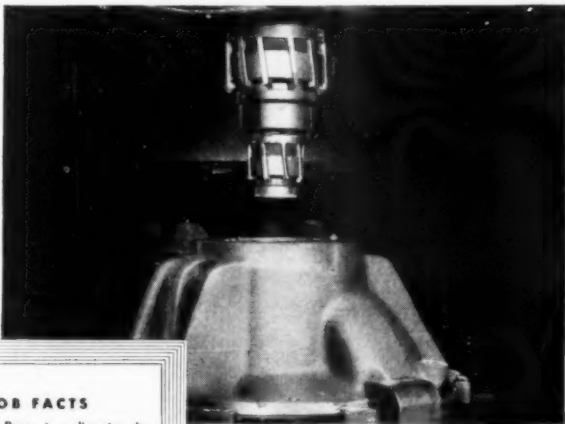
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GENERAL OFFICES AND PLANT 151 COLUMBIA ST., ROCKFORD, ILLINOIS, U.S.A.



JOB FACTS

Operation — Ream two diameters in alignment

Material — Malleable Iron Casting

Tool Life — 3000-4000 castings per sharpening

Tolerance — Diameters finished within .001"



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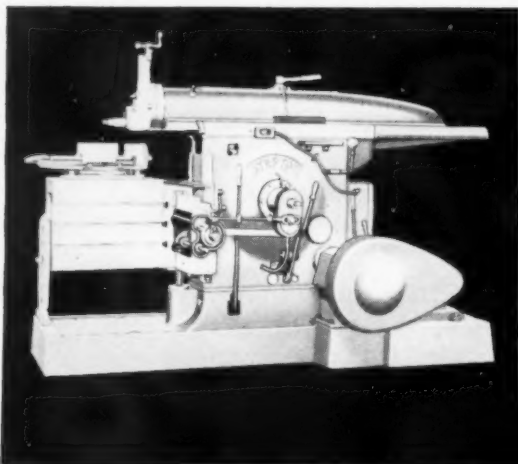
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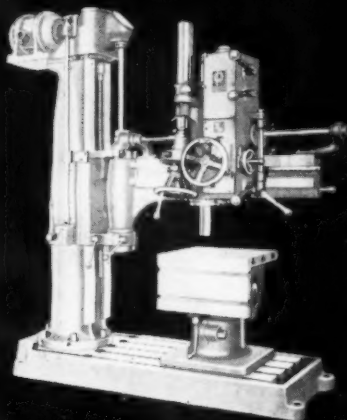
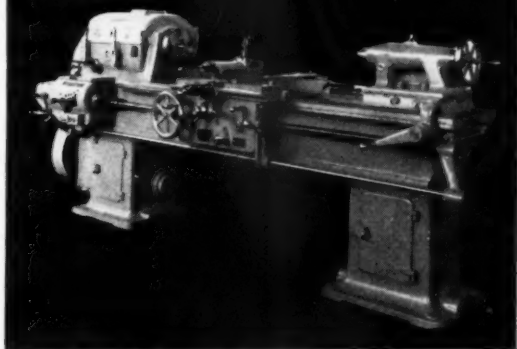
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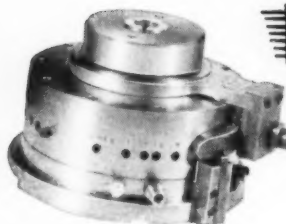
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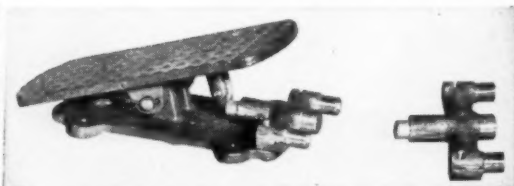
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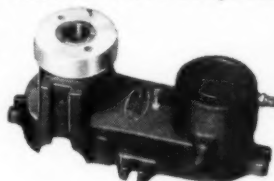
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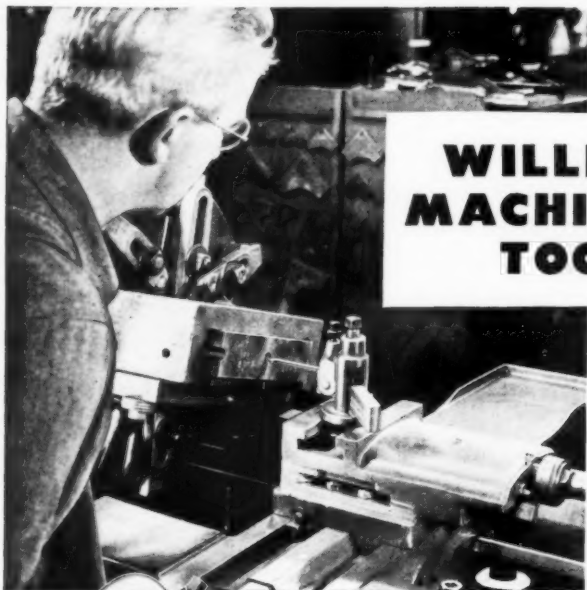
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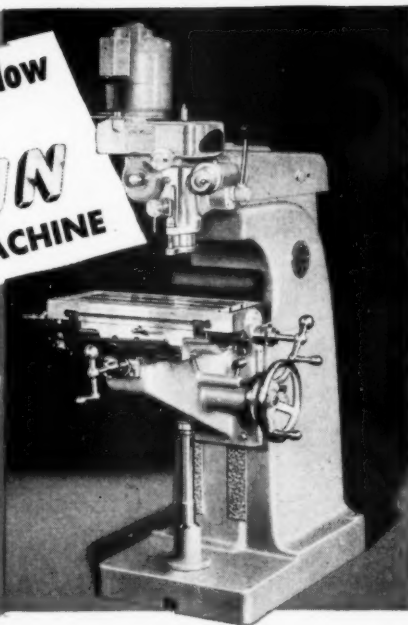
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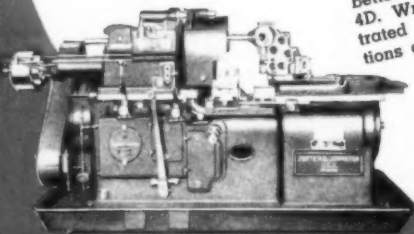
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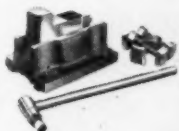
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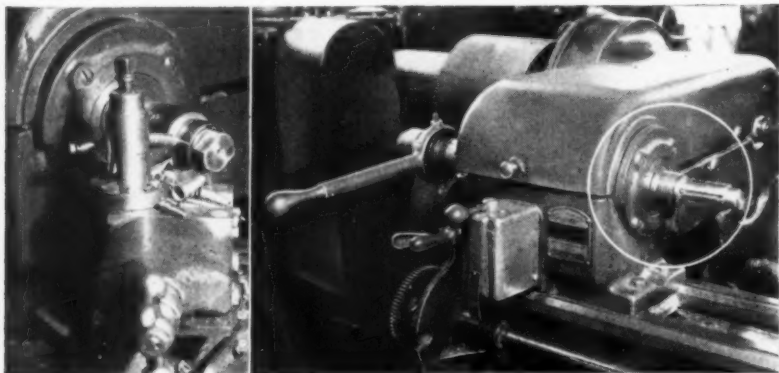
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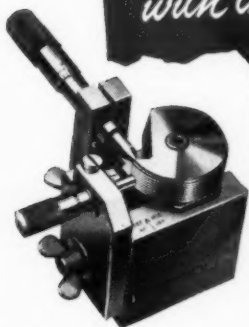
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Namco Micrometer Gage
Insures Identical Regrinds on
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Chasers—sizes $\frac{1}{16}$ " to $4\frac{1}{8}$ "

EXCLUSIVE VERS-O-TOOL FEATURES

- ★ Simple head with fewest parts, hardened and ground throughout; adjustment to size is quick and positive.
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- ★ Micrometer gage control for regrinding.
- ★ Chasers interchangeable, size for size, in revolving and nonrevolving heads.
- ★ Hollow milling cutters for end forming and turning you get double duty from Vers-O-Tools.

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Vers-O-Tool Circular Chasers, regrindable through a full 270°, last 10 to 20 times longer.

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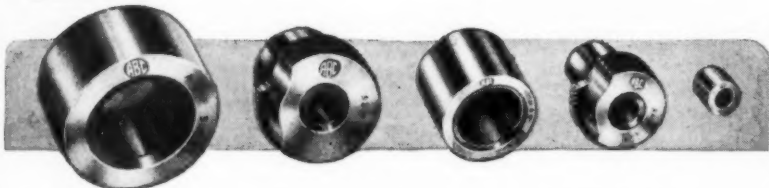
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*Stock of popular sizes carried at these locations.

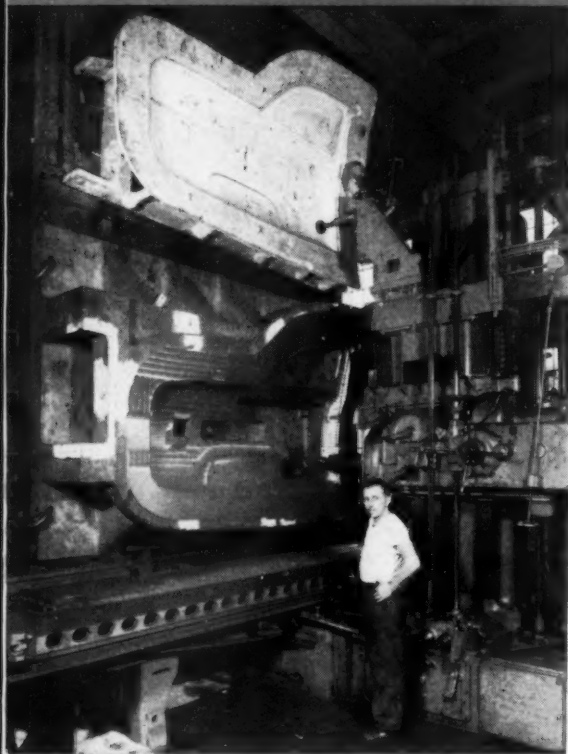
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DI-ACRO precision bending is accurate to .001" for duplicated parts. DI-ACRO Benders bend angle, channel, rod, tubing, wire, moulding, strip stock, etc. Machines are easily adjustable for simple, compound and reverse bends of varying radii.

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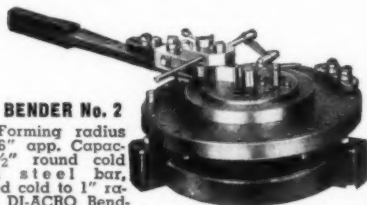
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Forming radius 2" app. Capacity 7/32" round cold rolled steel bar or equivalent. All DI-ACRO Benders have two-way action, right or left hand mounting and reversible forming nose.



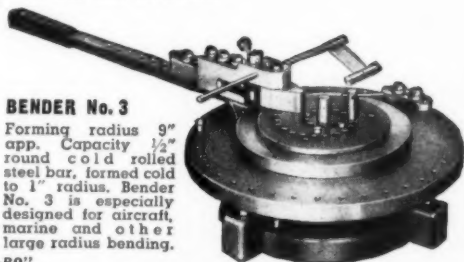
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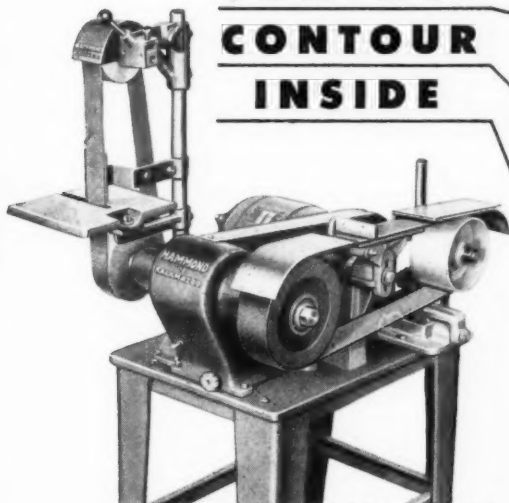
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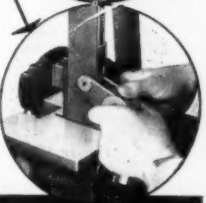
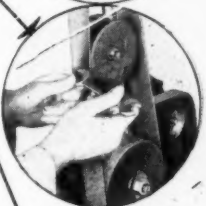
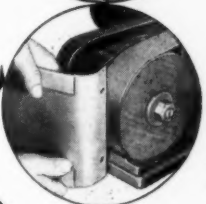
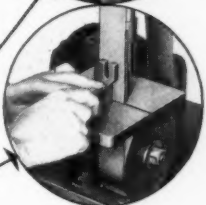
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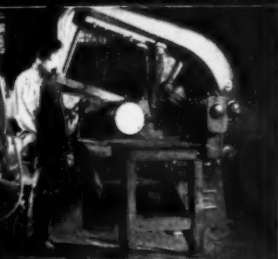
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111

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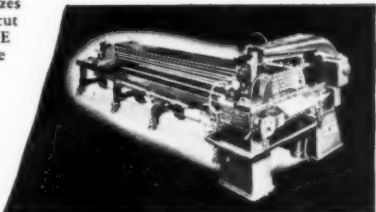


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Out on Chicago's west side, the Kropp Forge Company puts RACINE Heavy Duty Hydraulic Metal Saws to a real performance test. In this modern forge shop, billets and blooms are cut to proper lengths for forging. Finished forgings are sawed to specified dimensions in a wide range of sizes and steel grades. Huge die blocks are also cut to working size as shown to the right. RACINE Automatics are used for high speed multiple cutting work.

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THE FIRST REQUIREMENT . . . DEPENDABLE H-P-M DIE CASTING MACHINES

To make money, you need die casting machines that are **VERSATILE** . . . machines that are **FAST**! That is why H-P-M all-hydraulic die casting machines "fill the bill". Take the H-P-M installation at Mid-Western Die Casting Company, Chicago, for example. Five H-P-Ms enable them to tackle any high pressure die casting job—even complicated parts like those illustrated. The money saving H-P-M features of quick die change-over, live hydraulic die closing, easy adjustments of speed and pressure really pay off here in stepped up production . . . lower costs . . . fewer rejects.

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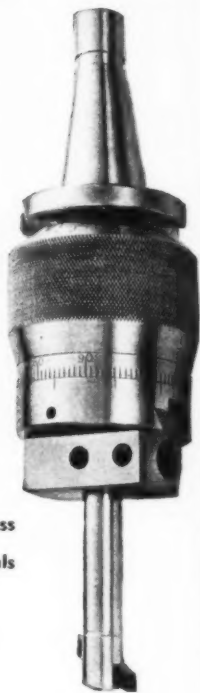
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These modern precision tools incorporate all new and practical features required for "All-Purpose" use. Get complete details and amazing price schedule. Write for Bulletin No. 3040.

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Put on—take off—as you
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Jig Grind—on your Jig
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The Vulcanaire System . . .
Includes an adapter to fit the
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When Jig Grinding is needed you can have it
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Place it in the spindle of your jig borer (or mill).

AND . . . Locate—Finish Grind holes in hardened
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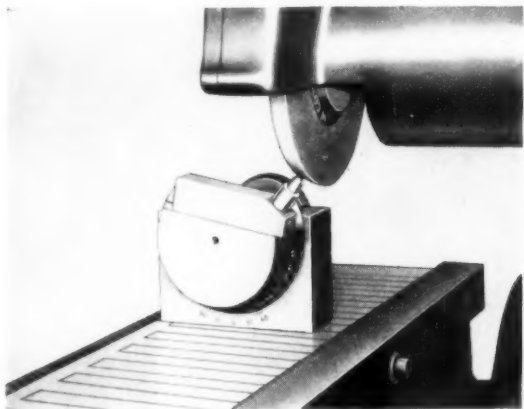
- . . Grind dowel holes—square with a ground base
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PLAIN TYPE \$70 NET

VERNIER TYPE \$82.50 NET

One Diamond is Furnished with each Dresser

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ENGINEERS
AND OPERATORS

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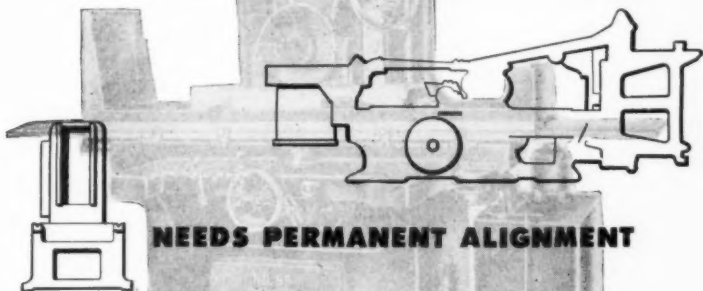
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**and GRAND RAPIDS GRINDERS
deliver continuous micro-accuracy***



The micro-accuracy of Grand Rapids Grinders comes, in part, from Gallmeyer & Livingston's unique method of making massive, one-piece column and base castings of close-grained gray iron . . . achieving vibrationless rigidity and permanent alignment between cross-travel ways and vertical head ways.

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* Accuracy within 0.00025 limits.

To serve you — Your inquiry concerning your specific grinding needs will receive prompt attention.

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FASTER SPEEDS . . . HEAVIER CUTS

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FEWER REJECTS . . . COOLER, CLEANER WORK

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with vertical adjustment**



Here's a new heavy duty boring tool holder designed to fit all sizes of Bokum Boring Tools up to No. 12. It brings you greater speed and accuracy in setting boring tools to correct height—a real convenience when setting up such critical jobs as taper boring or internal threading.

The holder and 6 split-sleeve adapters form a set in a special box. The holder is bored to take $1\frac{1}{2}$ " shanks directly and with sleeves the following shank sizes: $\frac{1}{2}$ ", $\frac{5}{8}$ ", $\frac{3}{4}$ ", $\frac{7}{8}$ ", 1" and $1\frac{1}{4}$ ".

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For complete catalog of Bokum Boring Tools ask for H-1139 for super high speed tools and for H-398 for carbide-tipped tools.

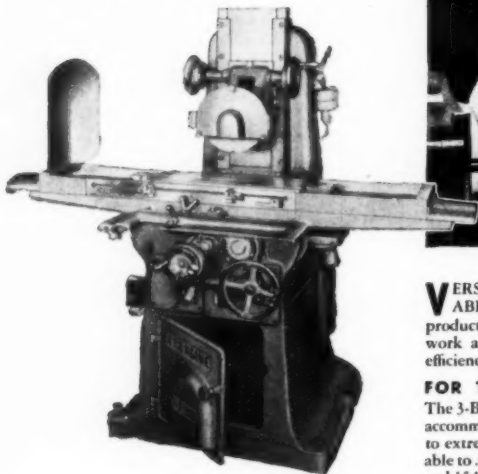


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BOKUM TOOL CO.

14775 WILDEMERE AVE. • DETROIT 21, MICH.

"THERE'S ALWAYS A JOB FOR THE 3-B"



SPECIFICATIONS

WORK CAPACITY:

24" long
8" wide
12" high

SPINDLE:

2290 R.P.M.
Cartridge type

DRIVE:

3 H.P. motor

TABLE SIZE OVERALL:

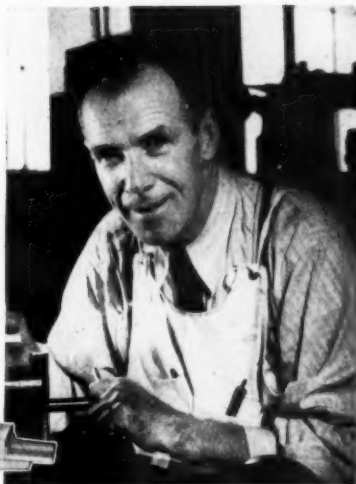
59" x 10½"

WHEEL SIZE:

Standard 10" wheel.
8" or 12" wheels on
order.

NET WEIGHT:

2670 lbs.



VERSATILITY is an important feature of the ABRASIVE 3-B Surface Grinder. This highly productive machine turns out precision tool room work and special one-time jobs with the same efficiency as it handles long-run production jobs.

FOR TOOL ROOM WORK

The 3-B, with 12" clearance under grinding wheel, accommodates bulky jigs and fixtures. It grinds to extremely close limits . . . vertical feed adjustable to .0001" for finest gauge work. Massive head and 1540 lb. one-piece bed casting minimize vibration. Dust protection throughout provided by metal guards. All controls conveniently centered for manual operation.

FOR LONG-RUN JOBS

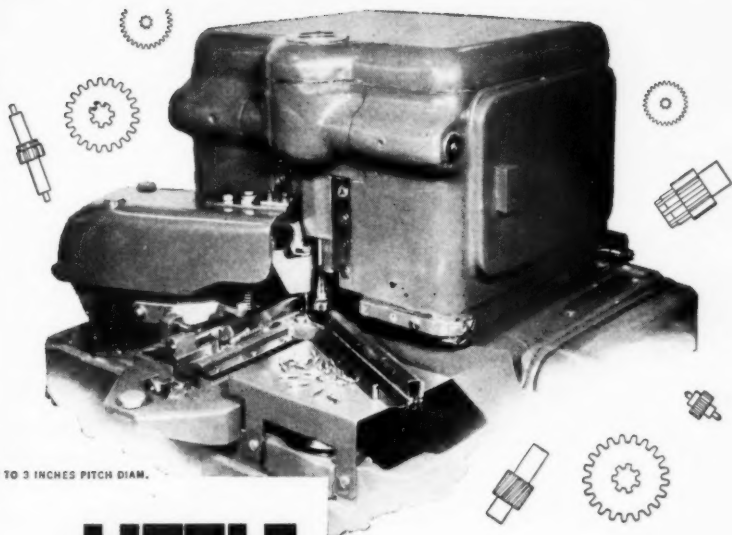
Rugged construction and ample power allow heavy cuts. Fast, automatic table feeds — 20 and 40 ft. per minute — and hydraulic shock absorber to cushion table reversal, help maintain heavy production schedules. Cartridge-type oversize spindle of alloy steel (1½" diam.) stands up in continuous operation. Top performance and long life are built into the 3-B.

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MACHINE TOOL CO.**

East Providence 14, Rhode Island





UP TO 3 INCHES PITCH DIAM.

LITTLE GEARS

**Fast, Accurate
and at Low
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Small, fine-pitch gears, pinions, and precision instrument parts, can be mass-produced on the Fellows Fine-Pitch Gear Shaper with duplicated accuracy. Ganging of work on arbors, and fast-operating magazine feed, opens new possibilities for small parts production. Generating on the Gear Shaper can contribute to the quiet smooth operation of many precision devices. Descriptive literature on request.

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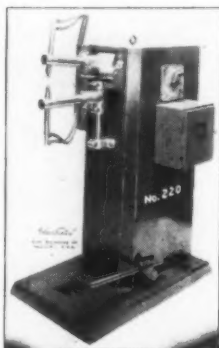
The Fellows Gear Shaper Co., Head Office and Export Dept., Springfield, Vermont. Branch Offices: 616 Fisher Building, Detroit 2; 640 West Town Office Building, Chicago 12; 7706 Empire State Building, New York 1.

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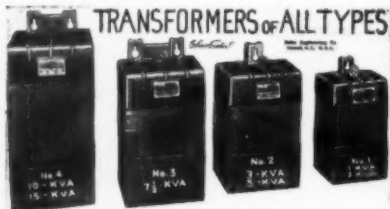


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Single to six spindle machines, equipped with hand feed, power feed or reversing motor tapping.



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plus

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plus

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2nd spindle — Plain power feed

3rd spindle — Hand Feed

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ADAMAS carbide prismatic tool bit for clamped tool holder—being used for machining heat-treated steel part of steering assembly from rough forging to finished size with **three times** the tool life of best competitive grade.



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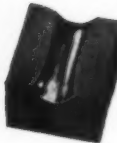
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ADAMAS carbide preformed tool tips—machining complex precision part for lathes with only **one tool**... tip preformed to specifications within one week required .010 finish grinding before use.



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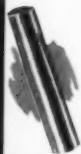
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Producers of top quality carbide for cutting tools, dies and wear resistance—both standard and special.

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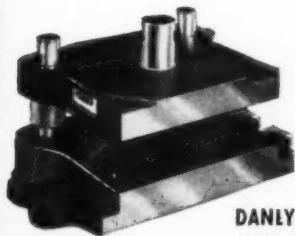
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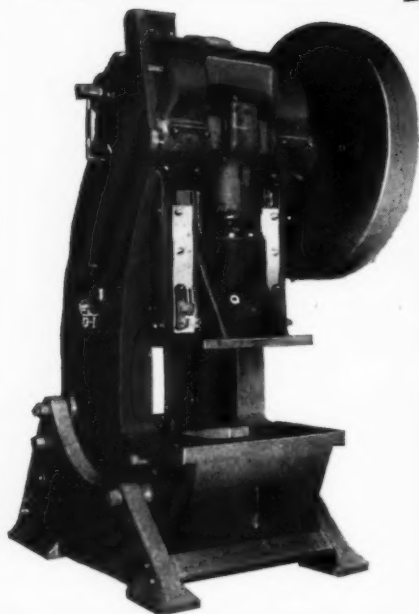
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150 tons Capacity



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Featured in ... this issue ...

BY HONING CYLINDRICAL PARTS, FAST STOCK REMOVAL, FINE FINISH AND CLOSE ACCURACY ARE OBTAINED, by C. Allen Fulmer. By applying large amounts of torque to the spindle and honing tool, along with complementary reciprocating speeds, stock in excess of one and one-half cubic inches per minute can be removed with accuracy to a specific surface finish. Almost any cylinder can now be honed, regardless of size. Extreme care is not required and honing stock allowances are liberal. Illustrated are gear blanks, diesel liners, automotive sleeves, etc., which show surfaces that lend themselves to honing. Page133

HUMAN RELATIONS PROGRAM OF MEDIUM SIZED MANUFACTURER INCREASES SALES, REDUCES UNIT LABOR COST WHILE MAINTAINING HIGH WAGE LEVEL, by R. C. Tyo. Porter-Cable Machine Company, Syracuse 8, N. Y., is a firm believer in the policy of increasing sales and profits through a better human relations program. In 1941 they introduced their human relations plan which included a profit sharing arrangement. Sales and production have increased and workers take home more money. Their belief in their convictions has paid off all the way around. Page147

NEW TOOLS, CLOSE ACCURACY PRODUCE MINING, CONSTRUCTION, OIL EQUIPMENT, by Gerald E. Stedman. The plant discussed is the Gardner-Denver Company in Denver, Colorado, greatly modernized since 1944 when there were still many line shafts; now nearly 100% of the machines are individually driven. The shop contains many new machine tools. They have a large die sinking department and all forgings and up-setting dies are made in the shop. A large plating department is operated for cadmium, chrome, nickel, copper plating. Page167

CAMS THEIR PRODUCTION AND APPLICATION, by John E. Hyler. Part 4 in

a series of 5. Mr. Hyler discusses method of checking amount of rise or fall at each station on a cam, types of followers, use of ball bearings as followers and special machine for milling cams. Ball bearings were used as followers in radial piston pumps, the pistons being radially disposed on a rotor. Such followers should be run only on cams that have been ground to a smooth finish. Page...179

SALIENT FEATURES OF HANDWHEEL DESIGN, by H. F. Williams. A handwheel may be counterbalanced either in the rim or hub. Some attractive modernistic shapes have been designed and curved front surfaces are being incorporated in handwheels. Page...205

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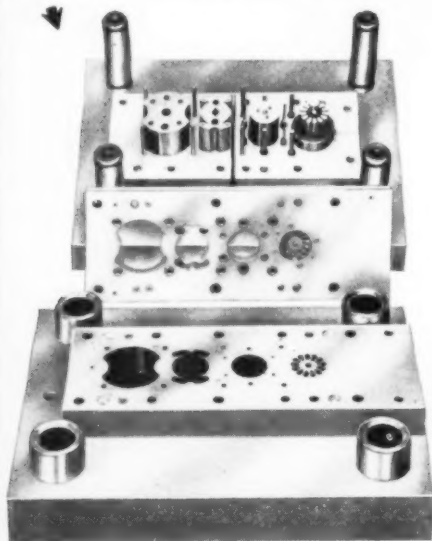
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As the ... editor SEES IT

DO AWAY WITH PROFITS?

"Greatest earning year in the history of the company." Sentences such as this accompanied many an annual report for 1947, made public in recent months by various companies. Unquestionably, the profits rolled up by some companies have been impressive. Enough so for commentators, columnists and some bureaucrats to don armor and lance and charge into the annual report screaming, "Capitalists, thieves, return the money." Other Quixotes of the Pen exhorted the government to take "corrective measures," as though a crime had been committed.

There are some companies in the consumer fields who've charged all the traffic would bear, but they are in the minority. To our knowledge, the metal-working industry: machine tools and accessories, etc., have been just and fair in any price increases they have made; and are entitled to their profits, such as they are (and some of them aren't much). Let's not hang all business for the greed of a few.

Yes, the majority of companies closed their books on a successful 1947. So did labor. So did the general public.

Yet, some of our commentators,

columnists and other well-meaning cracker-barrel economists, noticing the 1947 profits would take them away from business and "return them" to labor, the public or the government.

We wonder if these people know why a man is in business, certainly not because he is an altruist who works for the fun of it. A man is in business to make a profit above his regular income. For this profit, uncertain as it is from year to year, he invests money, time, energy, gives employment to hundreds, buys materials from some one else who in turn gives employment to other hundreds. And thus starts a chain, which raises the standard of living for everyone connected even remotely with the business, and builds the richest nation in the world . . . all because a man wanted to make a profit above his regular income.

If this be a crime, then perhaps our armchair economists would like communism where they can criticize from behind a barbed wire fence in a concentration camp, and where business would be police controlled, and no one benefits except maybe the commissars and their yokels.

William F. Schleicher

Editor

A BUYING GUIDE FOR ABRASIVES

ABRASIVE PROBLEM:
Is there a better abrasive
or technique for the job?



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CARBORUNDUM
TRADE MARK

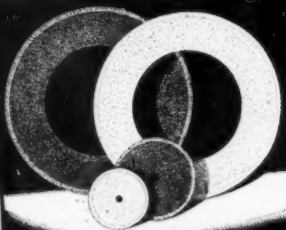
Key step between research and abrasive user, "Product Development" is an important activity at The Carborundum Company. Aimed at the development and application of the right abrasive in the right place, it brings about closer cooperation among abrasive machine builders, abrasive users, and our own research.

Products and techniques are rigidly tested and evaluated for both grinding wheels and coated abrasives. Suggestions are investigated and analyzed. Vital information is collected and interchanged. Facts and figures are checked and correlated. The net result is realized in more effective selection and application of abrasives... another reason for preferring products by CARBORUNDUM. The Carborundum Company, Niagara Falls, New York.

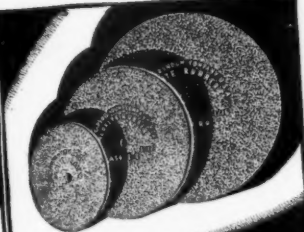


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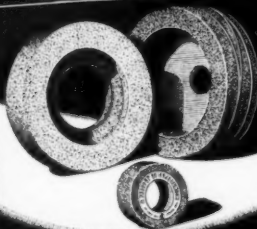
A Good Rule for Good Grinding



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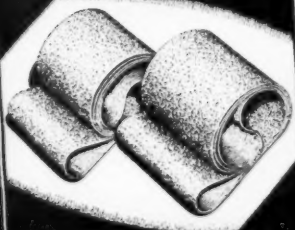
Cutting-off wheels... the modern tool for faster, less costly, more finished cuts.



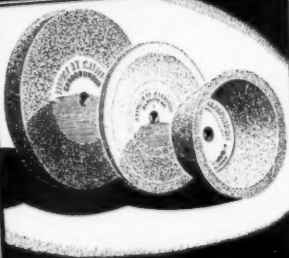
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BY HONING CYLINDRICAL PARTS

*fast stock removal, fine finish and
close accuracy are obtained*



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President, C. Allen Fulmer Co.

Stock can be removed by honing in excess of one and one-half cu. in. p.m. to extreme accuracy and fine surface finish. Advances in honing technique adapt this method of finishing to many differing products. Careful attention must be paid to the honing stones and manner in which they are used.

THE FIRST of the hydraulically operated honing machines came into existence about fifteen years ago. Even they were fundamentally built around vertical drill presses, but were much superior to the early mechanical machines, where the speed of reciprocation was slow, wear of mechanical parts rapid, and the manual reciprocation of the spindle by the operator extremely tiring. The amount of stock removed by honing machines was negligible. Some of the early manufacturers soon realized the possibilities inherent in removing metal quickly and accurately by honing, which is in reality an "abrading process" where a large area of abrasive at low surface speed is in contact with the work, as distinguished from grinding. The early honing tools were often called grinding tools.

Our organization, from the start, began to apply large amounts of torque to the spindle and honing tool, along with complemental reciprocating speeds that could be set from zero up to about two feet per second, with high push and pull available to drive the tool through the work. Thus, stone pressures could be such as to permit thousands of cutting edges to do the work and remove, by cutting or shearing, many times more stock than had ever been considered possible hereto-

fore. Stock removals in excess of one and one-half cubic inches per minute could be obtained, and was accompanied by extreme accuracy and a specific surface finish. Up to one-eighth inch of stock could be removed in a honing operation on tough steel forgings, thus revolutionizing the honing art. With stock removals of that scope, cylindrical work could be machined in the preceding operation without extreme care and with liberal honing stock allowances. The honing operation would generate dimensional accuracy, roundness straightness and do so in a fraction of the time previously required for grinding, precision boring or reaming. Along with this accuracy, any desired surface could be obtained.

Generally speaking, it has always cost extra money to obtain extreme accuracy. But with honing, this accuracy is obtained without any increase in cost. The same applies to surface fin-

ishes. These advantages, added to rapid stock removal, put honing into the class of finishing operations where production costs could be brought down to the lowest figures. With rising labor costs this became a very profitable advancement. As an example, a heavy forged bull gear pinion of 4145 steel containing two 6" long in line bores with .005" of stock to be removed was formerly reamed to 4.250"-.001" in ten minutes. Surface finish was approximately 100 micro inches. When the finishing operation was changed to honing, these two holes were finished in a total time of one minute to 4.250"-.0002", removing the same .005" of stock, with a surface finish of 10-12 micro-inches. There was a saving of 90% in production time, accuracy was improved 500%, and surface finish improved 1000%.

Wide Range of Application

In the minds of many production

Fig. 1. A profilograph record of connecting rod machining operations showing the various surface finishes resulting from different means of final finishing.

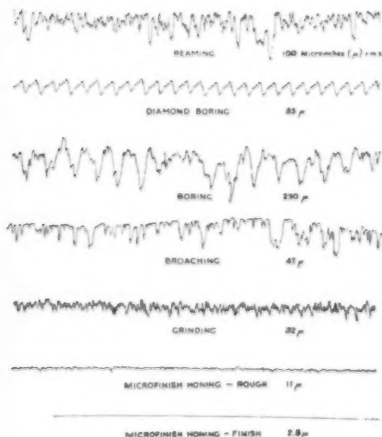
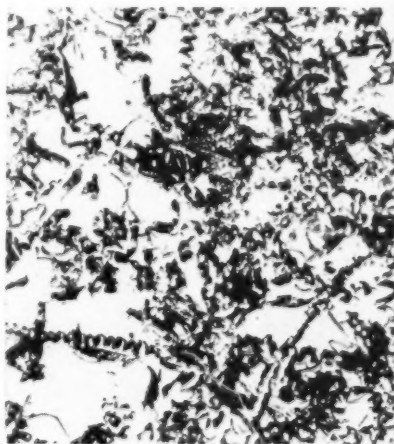
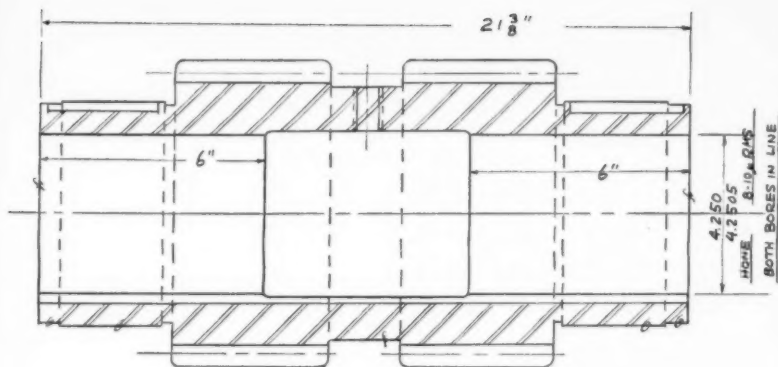
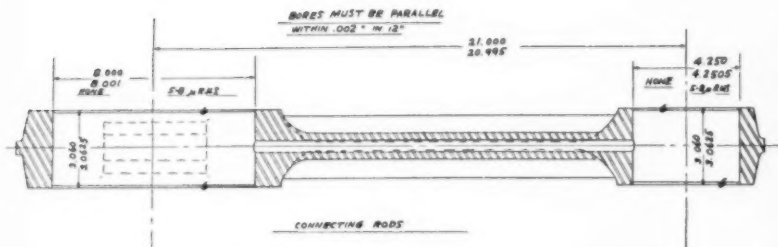


Fig. 2. A photo micrograph of honing chips removed in honing a steel cylinder. It vividly shows the magnitude and volume of chips that can be removed.





GEARS



CONNECTING RODS

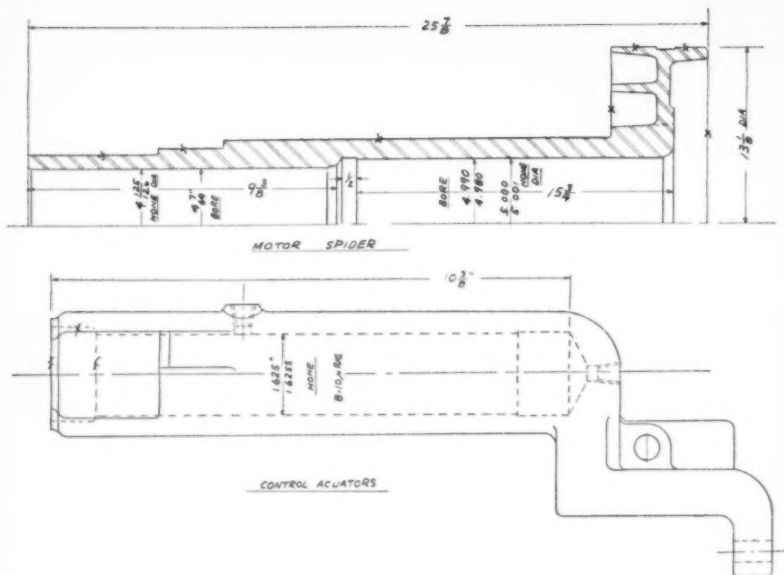
Drawings of various parts which have been successfully honed.

• • •

men, honing has always been thought of as a cylinder finishing operation. In the honing machine industry, any class of internal cylindrical surface is considered as to the possibility of being finished by honing. The bores at either end of a connecting rod can be classed as short cylinders. The bore in the hub of a car wheel or gear is another short cylinder. These cylindrical surfaces can be long or short, open at both ends, closed at one end, contain different diameters, ports, shoulders or interruptions in the surface to be finished. Nearly all of them are adaptable

to rapid finishing by honing. See drawings.

Since modern honing machines are capable of removing large amounts of stock rapidly, the cost of the preceding operation can be reduced. It is not necessary to hold this operation to close limits nor the stock to be removed by the honing operation to a small amount. The honing allowance can be liberal and the bore can be tapered or out of round. The honing operation will correct these errors. It is much cheaper to hone an excess of stock off, than to spend extra time bringing the



Drawings of various parts which have been successfully honed.

honing allowance to within small limits. There have been cases where up to .075"-.100" of stock can be removed by honing, much faster than the piece can be finish bored to a small honing allowance, and then honed to size.

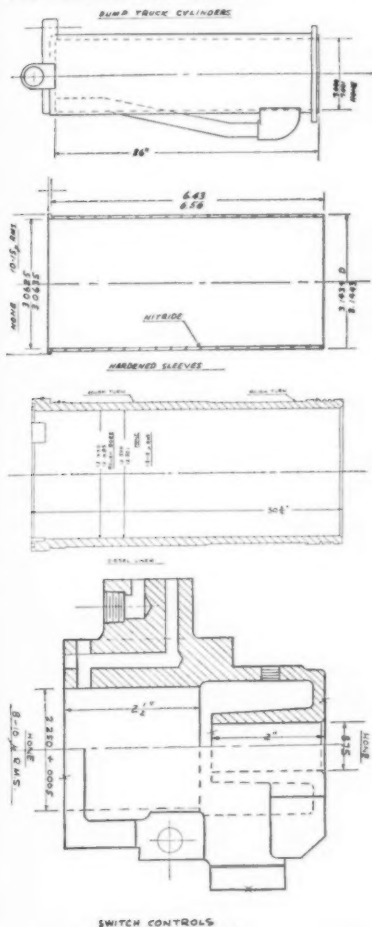
To production men not familiar with modern honing, some important factors are often overlooked in setting up for a honing operation. Fast stock removal requires a tremendous torque input to the spindle and honing tool. Up to 60 hp at 10 or 12 rpm is applied to the honing tool on some large work pieces. Along with this torque is from 3000 to 5000 pounds of push and pull to the machine spindle and honing tool. These forces require large bearings, gears and shafts. This means that the fixturing to hold the work must be such as to really **hold** it. There have been

instances, even with smaller machines, where the torque being applied to the work was great enough to shear off four bolts, 5/8" in diameter, that were used to clamp the work to the machine base.

The stone cutting area in contact with the work may range up to over 100 square inches, with unit stone pressures ranging up to 150 lbs. per square inch. To assure grit penetration so that each grit will effectively cut and with thousands of cutting edges in work, ample power must be available to drive the tool, along with commensurate work holding facilities. Yet under maximum stock removal conditions in honing, .040" thick nitrided steel automotive liners are having .005" of stock removed in a honing operation to limits of plus or minus .00025" in less than

1½ minutes per piece. On such a thin walled sleeve, were it finished by grinding, the unit grit pressure of the wheel that is doing the work would be hundreds of times greater than in honing.

Drawings of various parts which have been successfully honed.



Also the shearing stresses would be higher along with greater heat generation and greater distortion of the work. In honing such a sleeve we have a number of stones, each with a large area in contact with the work. Each of the thousands of grit cutting edges have a low unit pressure against the work with low shearing stresses and low heat generation.

Figure 1 are profilemeter graphs of various surface finishes resulting from different means of final finishing. Figure 2 is a micrograph of honing chips that are removed in honing an alloy steel cylinder.

Interesting Applications

Also illustrated are typical work pieces of various types, that show surfaces that lend themselves to being finished by honing. Among them are gear blanks, diesel liners, automotive sleeves, connecting rods, motor armature spiders, dump truck cylinders, switch controls, acuate cylinders, etc. Among these are items that, a few years ago, would not have been thought of as honable. For example, on armature spiders that formerly were rough and finish bored and then reamed, limits of .001" were very hard and expensive to maintain and rejects were high. When changed to honing, the finish boring and reaming operations can be eliminated and the spider honed from the rough bore. Tolerances of .0005" can be maintained, with a honing time of 5 to 6 minutes per piece—a saving of more than two hours over the previous method used.

On a motor pedestal bearing support it took fifteen hours to bore and hand scrape the pedestal to a slide fit for the outer race of the bearing. When changed to honing, these pedestal bearings can be bored and then honed to size with a tolerance of plus .0005 in five minutes. The savings effected in finishing by honing is thirteen hours per piece.

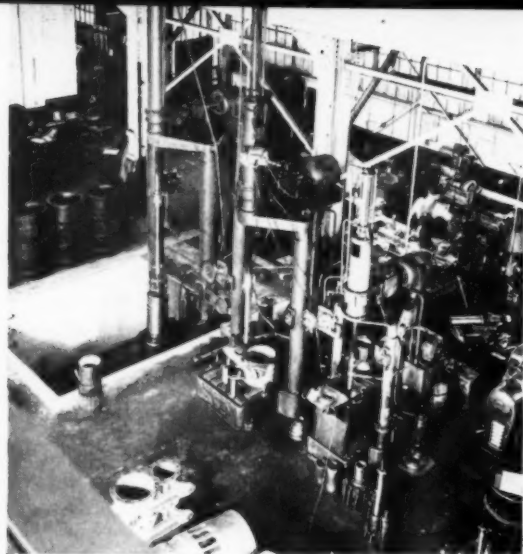


Fig. 3. A battery of honing machines at the Van der Horst Corp. Products being finished include diesel liners, a cylinder from a cross compound air compressor. Cylinders of other sizes and types are on the floor. All of them were finished on these machines.

On a chrome plated diesel liner, $8\frac{1}{2}$ " in bore by 32" long, .004-.006" of chrome is removed by honing, to a tolerance of .0005" in three minutes per liner.

$12\frac{3}{4}$ " bore semi-steel diesel liners with .006-.008" to be removed are honed to .001" tolerance in 5 to $5\frac{1}{2}$ minutes per liner.

Hardened forged steel sleeves 60-65 RC, with .015-.018" of stock to be removed are honed to 7.750-7.751" diameter in 10 minutes.

Gas engine cylinders 11" bore x 30" long with .008-.012" of stock to be removed are honed in 4 to 5 minutes.

Compressor cylinders 18" in bore by 48" long with .015" of stock to be removed are honed to a tolerance of plus .001" in 10 to 12 minutes. See figures 3, 4, 5, 6.

Abrasives Used In Honing

In honing, the rotation of the honing tool carrying the abrasive stones generates roundness, and the complementary reciprocatory movement of the tool

through the bore generates straightness. The degree of surface finish obtained is dependent upon the grit of stones used in the tool. It was thought, for many years, that coarse grit stone should be used for fast stock removal. This often required a finish honing operation to get the required surface finish. However, due to the great improvements made by the abrasive manufacturers, a finer stone is now used, so that all the honing is done in the one operation. The finer stones were found to take stock off faster than the coarse stones and do the entire job without a finish honing operation. In addition, stone life was materially increased.

A common fault among firms using honing equipment is the use of stones that are too hard. A stone that is too hard will not cut rapidly, will glaze quickly, and will generate excessive heat in the work being honed due to the inability of the abrasive grits to penetrate the surface of the work so they can cut effectively. In honing, the work cannot be "burned" as in grind-

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Fig. 4. Finishing hardened forged slush pump liners, 65 RC, removing .018" of stock from a 7 $\frac{3}{4}$ " bore in 10 minutes in the plant of Rassmussen Mfg. Co.

ing, because of the much slower surface speed of the honing stones over the work surface.

Experience has shown that with softer grades of stones grit penetration is much deeper. Larger chips are removed with a minimum of heat generation, thus reducing the honing time. The work stays cooler as the unit stone pressure can be lower for the work being done. Too soft a stone will cut freely, but the stone wear will be rapid. One should decide on a stone with a bond that is soft enough to cut freely, yet give reasonably long stone life.

To permit a honing stone to cut, instead of rub, the stock off, the proper complement between rotating and reciprocating speeds should be available in the machine being used. The machine should have a reasonable range of rotating speeds, as the maximum surface speed rarely exceeds 250 fpm. Coupled with that should be an extremely wide range of reciprocating speeds. This will permit, for a given rotating speed, the proper complementary reciprocating speed to assure fast cutting by the stones. With the proper rotating and reciprocating speed combination, for a given job, the rate at which stock can be removed in a honing operation is astounding.

A Few Honing Hints

A few suggestions we have found valuable to operators of honing equipment might interest the reader. Slowing the rotating surface speed will make the stones "act softer". Increase of reciprocating speed will have the same

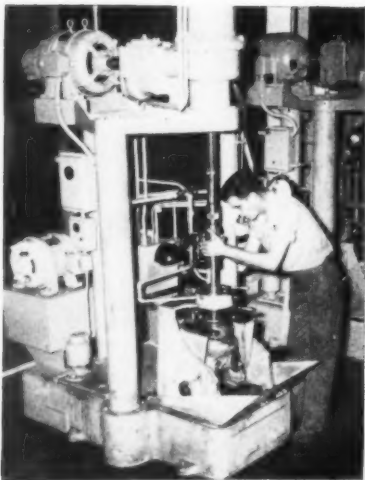


Fig. 5. A honing machine at Cherry Point Marine Base. P & W aircraft cylinders are being honed at the rate of 24 per hour.

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effect. Reversal of the stone holders, after the stones begin to glaze, will put a fresh set of cutting edges in contact with the work and thus increase the rate of stock removal. Honing stones are cutting when they are squealing, and a quiet honing operation is not removing stock rapidly. Stones should be fed out at intervals, at various points over the stroke length, and not always at the same place in the piece being honed.

If using stones that are too hard, and softer ones are not available, reducing the stone area in contact with the work will sometimes improve the cutting action of the stones.

With stones that do not cut freely, reducing the viscosity of the coolant will permit greater grit penetration and improve cutting action of the stones being used.

Very hard materials generally require a softer grade of stone.

In changing to finer grit stones, the finer grit stones should be at least two grades softer for rapid cutting.

Some of the coolants used in the honing of various materials are listed for the convenience of the readers:

Stones are cemented in the shells or holders in various ways. A few of the

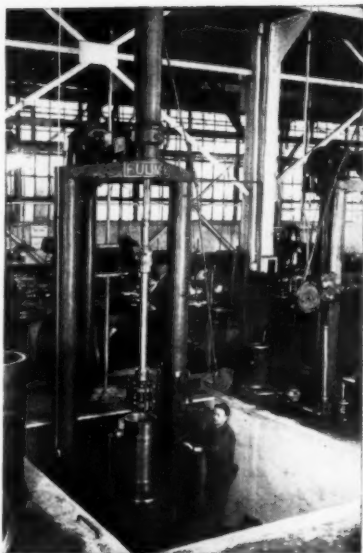


Fig. 6. Finishing large diesel liners at the Van der Horst Corp. From .004" to .006" of pure chrome is being removed.

• • •

mediums used are: Duco No. 9 cement, melted flake shellac, melted sulphur, and melted lead or babbitt. THE END.

Cast Iron
Soft steel tubing

Alloy steel forgings

Hardened steels

or

Monel metal

Brasses or bronzes

Kerosene or mineral seal oil

50% lard oil
25% Union base oil
25% kerosene
50% kerosene
50% Union base oil
50% kerosene
50% Red Oil (oleic acid)
90% machine oil
10% distilled turpentine
60% mineral seal oil
40% machine oil

To prevent loading, new stones should be dipped in hot paraffine wax until the stones become saturated.

The coolant for the bronzes is 75% mineral seal oil and 25% Union Base Oil.

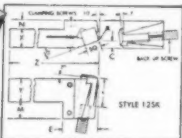
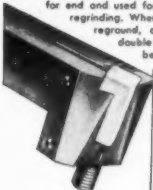
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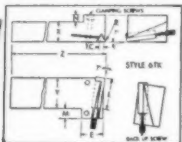
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Style 6RK (and opposite hand 3RK) have cylindrical inserts that can be indexed several times, then turned end for end and used for a second cycle of cutting before regrounding. When both ends become dull, they are reground, and are then ready for another double cycle of cutting. The inserts can be reground many times.



Style 12SK (and opposite hand 11SK) have square inserts, indexable four times on each end. Ends can be reground many times and each double-end regrind provides eight resharpened cutting edges.



Style 6TK (and opposite hand 3TK) have triangular inserts, indexable three times on each end. Ends can be reground many times—and each double-end regrind provides six resharpened cutting edges.

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Inserts are mechanically-held, *vertically*—best use is made of high compressive strength of Kennametal (up to 800,000 PSI); brazing strains are eliminated.

Indexable Cutting Edges

Can be indexed 6 to 12 times before regrounding. Indexing is a simple operation, and does not require changing tool holder.

Replaceable Inserts

Few standard sizes can be used in a variety of tools and jobs—simplifies tool control; reduces toolroom stocks.

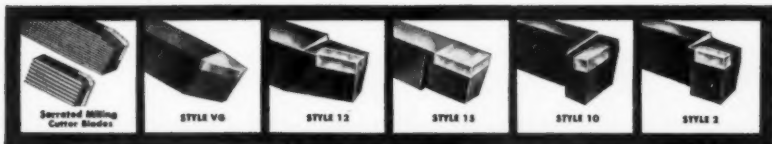
Simplified Regrinding

Resharpening merely requires squaring off both ends of insert, and grinding chip breaker if required—reduces load and confusion in grinding room.

Permanent Setting

Insert can be indexed or changed without changing tool holder setting—less set-up and machine down time.

The overall result of Kennamatic tooling is that higher production rates can be reached, and maintained, at much less cost. Let our engineers suggest suitable applications.



When Writing Advertisers Please Mention **MACHINE** and **TOOL BLUE BOOK**

SAVE HANDLING—SAVE LABOR COSTS ON SMALL PARTS DRILLING AND TAPPING



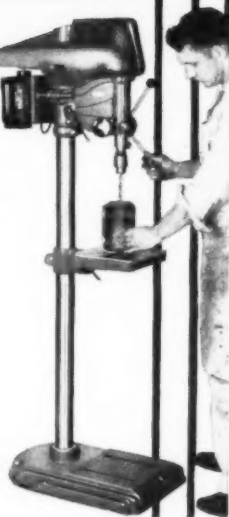
WITH *Atlas* DRILL PRESSES

You save set-up time... save parts handling... get *more holes drilled and tapped per hour*... by tooling Atlas Multiple Drill Presses for series operations.

Massive precision-ground oil tables give you plenty of smooth working surface. Drill heads feature two Atlas "exclusives"—4-bearing "floating drive" spindle and unique head-positioning mechanism—for easier, smoother, high-speed precision operation. Made in 2, 3, and 4-spindle models.

Also, check Atlas 15" Floor Model Drill Presses... solid, low-cost, precision-built... readily adaptable to countless production requirements. They're real time and money savers too.

Ask your Atlas distributor for full details. Send today for latest catalog.



ATLAS PRESS CO.

450 N. PITCHER ST.

KALAMAZOO 13, MICHIGAN

*Honestly
now—*

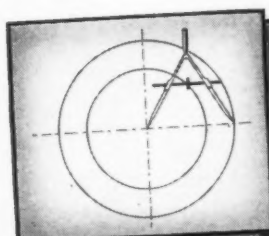


GREEN—GO

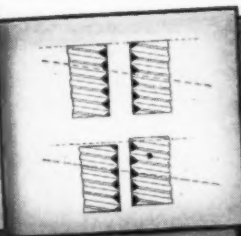


RED—
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. . . DOES YOUR PRESENT RING GAGE GIVE YOU THESE BENEFITS?



CONSTANT ROUNDNESS



POSITIVE THREAD ALIGNMENT



LONG WEAR LIFE

IT STARTS ROUND AND STAYS ROUND WITH EVERY ADJUSTMENT

Constant roundness, positive thread alignment and long wear life—are you getting these benefits from your present thread ring gage? Today across the country, scores of industries are converting these Woodworth Gage features into dollar profits.

There's no intricate mechanism to adjust. It's me-

chanically simple. Once adjusted, the setting will not change with ordinary shop use.

In addition Woodworth gages are 50% less in weight and have positive identification with Green for Go Gages and Red for Not Go Gages. We'll be happy to answer any inquiries addressed to the Company.

ACCURACY YOU CAN TRUST

WOODWORTH

N. A. WOODWORTH CO. • 1300 EAST NINE MILE ROAD • DETROIT 20, MICHIGAN
PRECISION GAGES • DIAPHRAGM CHUCKS • CONE-LOK JIGS • PRECISION PARTS

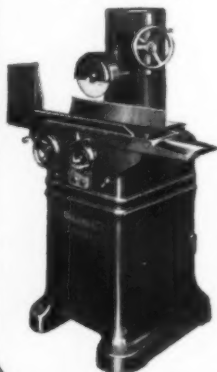
MODEL 6-12

THE TOOL MAKER'S
"Personal Grinder"

MODEL 6-18 SURFACE GRINDER

An extremely accurate Surface Grinder, highly recommended for tool room work and gauge grinding. Its rugged construction and superior engineering assure constant accuracy for a longer period than is usually expected of the ordinary surface grinder.

Write for Catalog



BOYAR-SCHULTZ BENCH MODEL SURFACE GRINDER

This sturdy, accurate Surface Grinder, mounted on the tool maker's bench, is quickly available for many small jobs that would otherwise go to the Grinding Department, interrupting important production runs. It is built with many new features and to the well known Boyar-Schultz standard of quality for close tolerance grinding on tools, dies, jigs, fixtures and gauges. An ideal tool for the small shop.

Write for Catalog and New Low Prices

PEDESTAL FOR MODEL 6-12 GRINDER



Made from heavy gauge angle iron, welded for rigidity and strength. With it, Model 6-12 Grinder becomes a Pedestal Machine.



BOYAR-SCHULTZ CORPORATION
2108 WALNUT STREET
CHICAGO 12, ILLINOIS

HUMAN RELATIONS PROGRAM of MEDIUM-SIZED MANUFACTURER

increases sales, reduces unit labor cost
:
:
:
WHILE MAINTAINING HIGH WAGE LEVEL.



By R. C. Tyo

Comptroller and Secretary, Porter-Cable Machine Co.

This medium-sized manufacturer increased output per worker from \$4,500 in 1938, to \$10,500 in 1946. Their unit labor cost has decreased 20% since 1939, yet wages are higher than U.S. average. An efficient human relations program is prime factor in reducing costs, increasing sales and profits. This year \$150,000 was shared among approximately 350 employees.

INCREASING sales and profits, reducing unit labor cost of production, and raising the gross "take home" pay, are objectives devoutly to be wished for. Since 1941, when the Porter-Cable Machine Company introduced the first part of a comprehensive human relations plan, of which a profit sharing arrangement is a part, we have sold more goods, boosted production, and our workers are receiving fatter pay checks. However, it is interesting to note that the accrued benefits of our human relations program were not the reason for inaugurating the program.

In 1941 the company had grown to about \$1,500,000 sales per year, and was making a fair profit. At that time Mr. W. A. Ridings, president of the company felt that it was time to set up an over-all plan for the use and distribution of this profit; such distribution to flow through the following channels:

1. Stockholders, through dividends, as a return for the risk of investing their money,
2. Employees or associates of the company through profit sharing, because it is through their ingenuity, cooperation and teamwork that profits can be increased over a normal level,
3. Customers, through reduced selling prices, as a

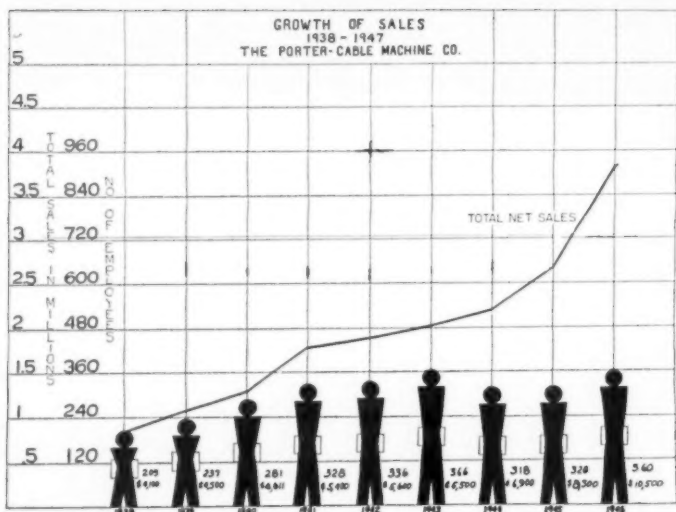


Fig. 1. The growth of sales from 1938 through 1946 and the number of people required to produce these sales. Output per men increased from \$4500 in 1938 to \$10,500 in 1946. While most of this increased output is traceable to greater effort on the workers' part; more efficient production equipment also contributed.

reward for investing their money and confidence in our products,

4. A percentage of the profit to be retained in the business as working capital.

Why Profit Sharing Was Organized

We realized, at the outbreak of the war, that the old line thinking regarding labor no longer applied. Labor was not a commodity to be bought and sold in the open market, yet the horse and buggy thinking of many management executives still classified labor in the same category with machines . . . get as much out of them as possible. In contrast to this, we believe labor is a part of management, in the sense that it shares in the profits of the company. Such a policy reduced labor strife for us, whereas other die-hard companies have had nothing but labor trouble.

This meant higher wages, lowered output, increased prices and, in some instances, impaired quality.

We were further convinced that a profit sharing arrangement would stimulate employee effort. Psychologists tell us that man uses less than 30% of the potentialities of his mind; thus over 70% of his mental capabilities are lying dormant, requiring only a little incentive to be aroused.

By stimulating worker output, a lower selling price could be maintained, resulting in an advantageous competitive position.

Details of Human Relations Plan

However, a profit-sharing plan is but a cornerstone of a human relations program. Since 1941 there have been additions to the human relations plan. It now includes the following:



Foreman: "Ferdinand's tickled pink since we switched from the old set-up wheels to these Armour Abrasive Belts!"

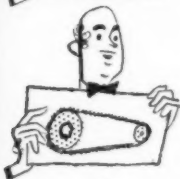
3 REASONS WHY ARMOUR BACKSTAND BELTS ARE BETTER!

1. Sharper Coating!



Ferdinand: "Take it from me—I've worked with both the old set-up wheels and these Armour Coated Abrasive backstand belts. And since we converted our bench grinders into belt grinders by using backstand units—we've had sharper, tougher, smoother cutting action. That's because factory-coated belts have uniform grain distribution. It was the inaccurate, uneven coating of the set-up wheel which slowed down cutting action."

2. Cooler Cutting!!



Foreman: "Right, Ferdy! We know, too, that belts afford greatly increased production because their cutting surface is greater. The point of contact on the belt gets a chance to cool as it passes around the idler. Results—cooler cutting, longer abrasive life, less tendency to burn work."

3. Greater Contact Area!!!



Ferdinand: "And with the resilient contact wheel you get a cushioned grind and greatly increased contact area. This cushioned grind gives us smoother, cleaner finishes—in less time, at lower costs—even on the surfaces that are hardest to reach. To us operators that means less fatigue—and my friend, the Foreman, knows that it also means more speed and greater production."

For abrasive advice—consult your Local Armour Industrial Distributor

ARMOUR and Company



Coated Abrasives Division

1355 WEST 31st STREET • CHICAGO 9, ILLINOIS

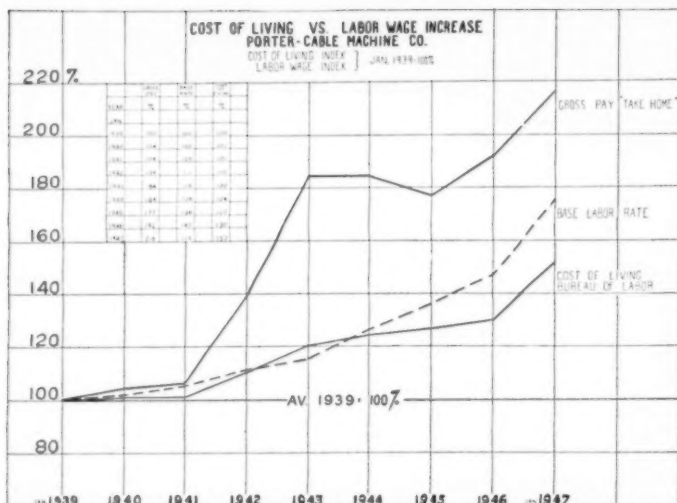


Fig. 2. Bureau of Labor cost-of-living statistics show an increase of 52% over 1939, whereas the Porter-Cable labor rate has increased 75% and average gross pay has jumped 112%. These percentages do not include profit-sharing bonus.

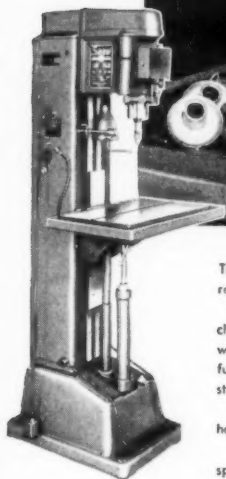
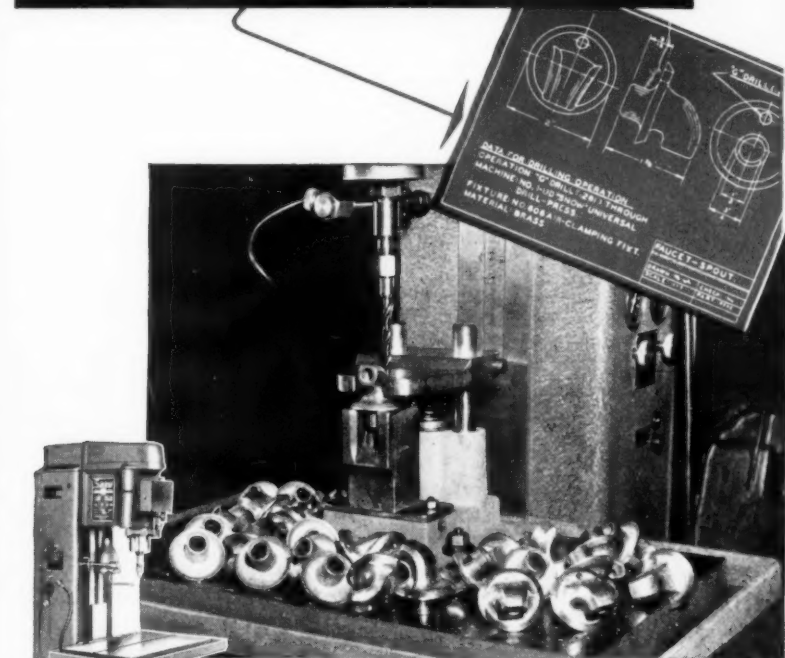
1—Multiple Management. Under this principle, all executives, supervisors, foremen, group leaders and other associates assume full responsibility for their job and contribute ideas toward it. This eliminates the one man organization in which the top executive thinks and acts for the entire organization.

2—Labor - Management Committee. Seven representatives of labor and three representatives of management meet semi-monthly to discuss the problems of each and endeavor to arrive at intelligent solutions. The representatives of labor are elected every six months by their associates in the factory and office by departments or groups.

3—Employee's Association. In 1941 the company financed the building of an employee's association clubrooms which includes four bowling alleys, pool

tables, ping pong tables, shuffleboard, two bars, cafeteria and dance floor. The employee's association was incorporated under its own name and four officers and four trustees were elected from office and factory by the people of the organization. They have their own by-laws, set of books and run their business without interference from the company. The association pays the company rent for the building and is paying back through a conditional sales contract at the rate of \$100.00 per month the original investment of the Porter-Cable Machine Co. Their source of income is from bowling, bar, parties and dances on which they must pay all direct and indirect expenses after which, in 1946, they showed a net profit of some \$5,000.00. The association has been one of the greatest factors in breaking down any class consciousness between man-

SNOW FULL UNIVERSAL DRILLING MACHINE



The SNOW Full Universal Drilling Machine permits the drill to set its own rate of feed resulting in higher production and greater tool life.

Precision limit switches offer extremely accurate depth control and allow instant synchronization of the many types of air operated indexing and clamping fixtures and jigs which have been designed for use with this machine. Low pressure air control built into this full universal equipment, combined with quality design and construction results in a sensitive and sturdy production machine.

This machine is capable of operating as high as 6,000 strokes per hour and has been production-tested in thousands of installations.

We suggest that you submit sample parts and blue prints for specific recommendations, production estimates and tooling data.

SNOW MANUFACTURING COMPANY

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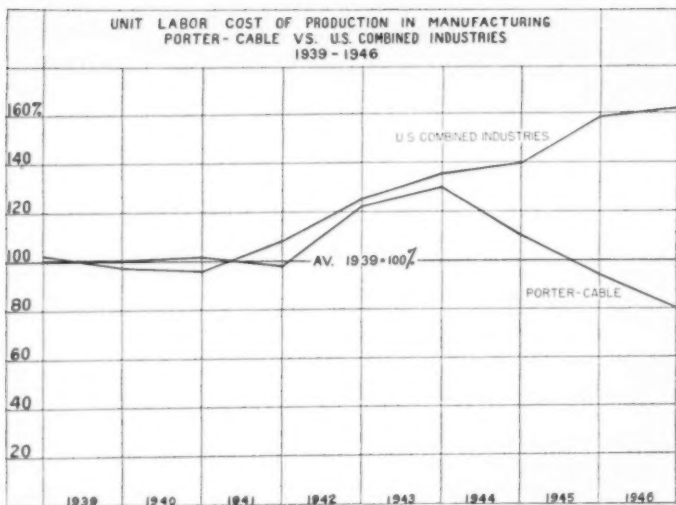


Fig. 3. Using 1939 as 100%, the unit labor cost in the United States has risen 62% as of December 1946. The Porter-Cable unit labor cost has decreased 20% from 1939 without reducing wages.

agement and labor or between office and factory.

4—Profit-Sharing. The profit-sharing plan calls for participation in the profits by all our employees who have been with the company one year or longer. The distribution of this profit is made once a year after the financial report for the company has been prepared. The amount of the profit-sharing fund is arrived at by means of a formula based upon percent of net sales. As the profit percentage to net sales of the company increases, the percentage set aside for employee participation also increases. When this fund has been determined, it is turned over to a trust. The amount to be received by each individual is based upon their income for the period from October 1st to September 30th.

Recently we distributed \$150,000 to

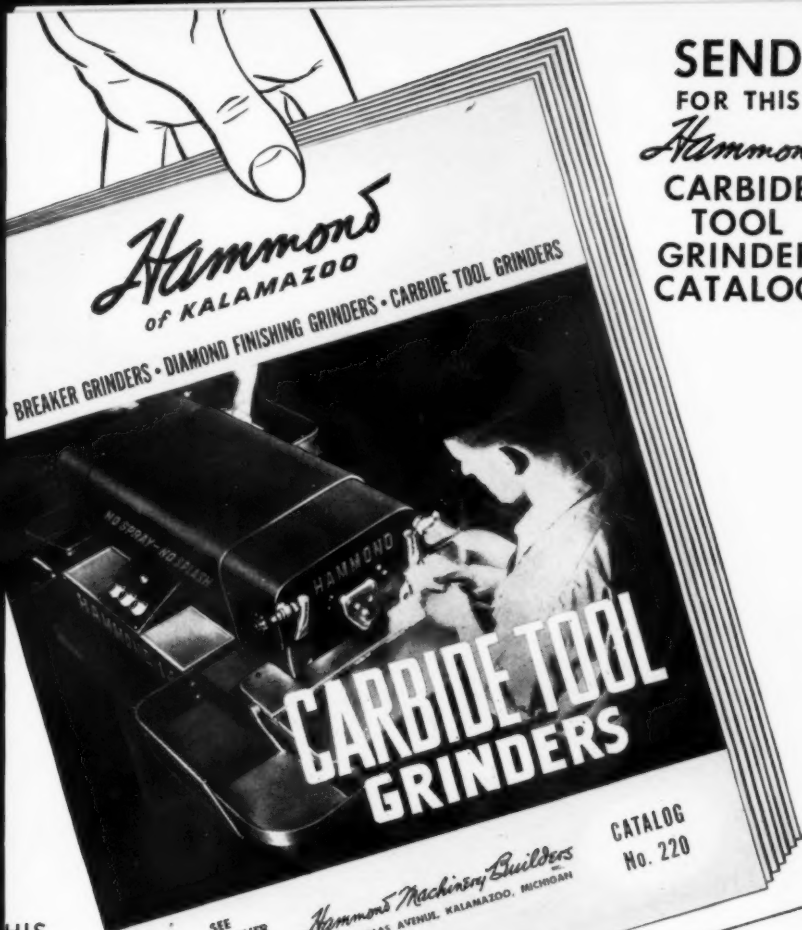
350 people who participated. The average share was approximately 8 weeks' salary per worker for the fiscal year.

It is well to always keep in mind, in connection with profit-sharing or any part of this plan, that in order for it to work, it must be based upon the right philosophy which includes unselfish motives. It must be built upon the faith and trust and confidence of labor in management and management in labor.

Many profit-sharing plans have failed because they were introduced as a substitute for high wages, and as such are a flop because employees look upon profit-sharing then as a part of their wages and in any year in which profits are non-existent, an ugly problem rears its head.

5—Pension Plan. A Pension plan is financed entirely by the company and

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GRINDER
CATALOG**



HIS

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CATALOG**

contains "Helpful
suggestions" on the
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of Carbide Tools and
shows our complete line
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bide Tool Grinders. Mail
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Individual _____
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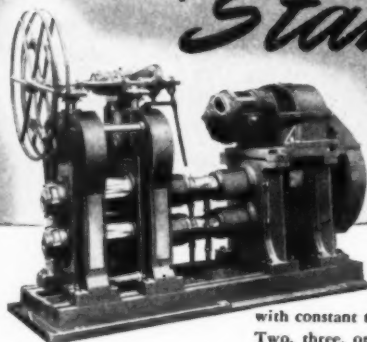
calls for retirement at age 65 or upon disability, illness, etc., and may be called a reward for years of faithful, loyal service.

6—Individual Incentive. We do not feel that profit-sharing is an incentive in itself for our people to produce more. It may have that result, but in any group bonus such as this, incentive has very little effect. We believe that profit-sharing does produce teamwork, cooperation and a feeling of confidence in the company. It makes employees realize that they are a part of the company, but individual incentive or piece work plans, such as we have at Porter-Cable, do produce greater output. This is because it is up to the individual to increase his earnings through individual effort without depending upon any other members of the group. All of the parts of the plan which have been mentioned, however, assist us in setting up and carrying on this individual in-

centive plan because it has instilled confidence in what we are doing. It is not difficult for us to sell our associates on changing incentive rates because of method changes, re-tooling, new machines, suggestions, etc., as they know this will result in lower labor costs, without affecting their individual income, which in the end will add more to the profits in which they are participating.

7—Suggestion System. Suggestions are turned in by all people in the organization with the exception of supervisors. A committee reviews all suggestions and attempts to pass on them promptly. If the suggestion warrants action, it is sent to the cost department to determine the saving involved. One-half of all savings on one year's production is given to the employee. An initial payment may be made first until this has been decided.

8—Music in the Factory. A balanced



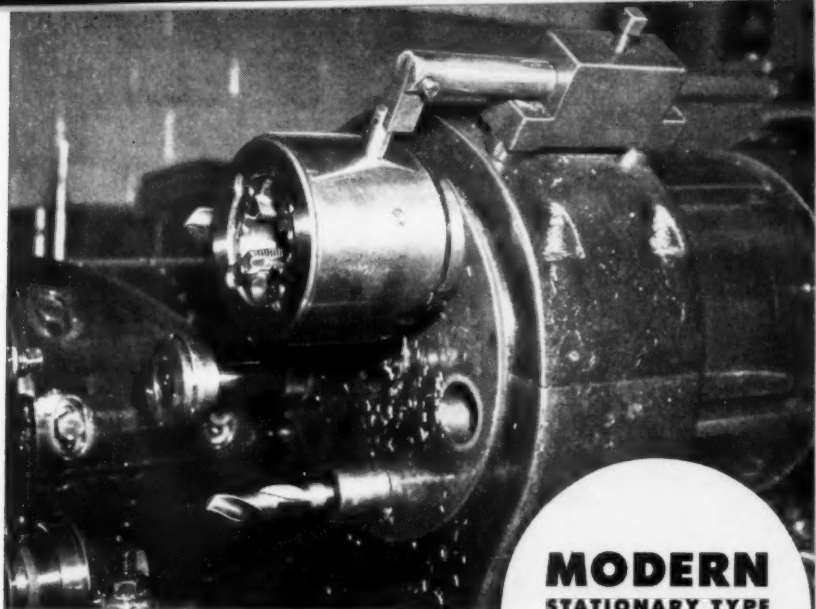
**MANUFACTURERS OF
POWER PRESSES TO 500
TONS, ROLLING MILLS,
SWAGERS, TURKS HEADS.**

"Standard" **ROLLING MILLS** FOR HOT OR COLD ROLLING OF STRIP, ROD AND INGOT

Speeds are provided for rolling metals in any range to 1000 feet per minute and tandem mill stands are designed with constant torque to synchronize stock between stations. Two, three, or four high Mills have roll sizes from 1½" diameter and 1" face to 16½" diameter and 18" face. Special units are also available for grading, cross and pinch rolling, forming wire to exact dimensions and for various shaping operations. Write for Catalog RM.

STANDARD MACHINERY COMPANY

1555 ELMWOOD AVENUE, PROVIDENCE 7, RHODE ISLAND



Here a Modern Stationary Type Self-Opening Die Head is shown in operation on a Cleveland Automatic. The die head's floating shank compensates for any difference between the lead of the cam of the machine and the thread to be cut.

MODERN STATIONARY TYPE SELF-OPENING DIE HEADS

Modern Precision Tools
Include

STATIONARY SELF-OPENING
DIE HEADS
ROTARY SELF-OPENING
DIE HEADS
STATIONARY
COLLAPSIBLE TAPS
ROTARY
COLLAPSIBLE TAPS
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FACE MILLING CUTTERS
SOLID ADJUSTABLE
DIE HEADS
ADJUSTABLE HOLLOW
MILLING TOOLS
UNIVERSAL CHASER
GRINDING FIXTURES

The line of standard Modern Stationary Type Self-Opening Die Heads thread diameters from $\frac{1}{8}$ " to 7" in standard heads and up to 14" in special heads, accurately, fast and economically. They are adapted to practically every thread cutting operation within their capacity. Designed for use in hand screw machines, turret lathes and other machines where the die head is used in a stationary position and the work revolves.

Complete information will
be furnished upon request.

MODERN TOOL WORKS

DIVISION OF
CONSOLIDATED MACHINE TOOL CORPORATION
ROCHESTER 10, NEW YORK



Fig. 4. Organized sports play a prominent part in the human relations program. Few plans promotes morale as well as competitive sports.

• • •

are entitled to know a few facts about the policies, financial conditions, sales policies, production schedules, forecasts, etc., of the company. Employees are eager for this information. These economic facts are brought to the employee's attention through a monthly house magazine and through group meetings where charts and moving pictures are shown. Night courses at the University and other schools are encouraged with financial assistance from the company.

Financial Facts Are Presented

Each year when the profit-sharing fund is distributed to the associates of the company, financial facts and figures are prepared to show them what has happened in the past year and the forecast for the coming years. For example, at our meeting on February 6, 1947, we presented the financial picture for 1946 by means of six simple bar and graphic charts, three of which are included in this article. The most important of these charts, in our estimation, showed what

• • •

9—Presentation of Economic Facts. Keep in mind that putting a plan like ours into effect, the company must go all the way. There can be no skeletons in the closet. If the employees are to be called associates of the company and be considered a part of the company, they

Fig. 5. The labor-management group meets semi-monthly to discuss mutual problems. Representatives of labor are elected by their associates.



happened to every dollar of income that came into Porter-Cable through sales in 1946. It was broken down to material, labor, overhead, selling, engineering and administrative, stockholder's dividends, profit-sharing fund, pension fund and profits retained in the business. At the close of the meeting everyone was given an opportunity to ask questions about any phase of the set-up which was not entirely clear.

One other result which is very worthy of note and which affects anyone who has purchased our tools is that in June 1946 the OPA gave all portable electric tool manufacturers permission to increase machine prices 15% and the belt grinding industry 20%. Because of our reduced labor costs we found it necessary only to increase our prices by some 7% to 9%. We would not have increased our prices that much except that 46% of our sales dollar is made up of material which we purchase from outside vendors and continued

increases from these vendors forced us to make this slight price increase.

Additions to the Plan Contemplated

We are still adding to our plan. Right now a voluntary company-employee participating thrift plan is being considered. We are constantly striving to make Porter-Cable a better place in which to work. We feel that satisfactorily meeting our non-financial obligations to our community, customers and employees is no less important than our yearly financial statement to our stockholders. **THE END.**

25% INCREASE IN LOAD CARRYING CAPACITY OF TIMKEN BEARINGS

A. L. Bergstrom, vice president in charge of Engineering of The Timken Roller Bearing Co., Canton 6, Ohio, announced a 25% increase in the radial and thrust load carrying capacities of their complete line of tapered roller bearings. This marks the end of an exhaustive 10-year study in their Physical Laboratory and in the field.

Anderson BALANCING WAYS

Shops handling rotating parts find this simple, sturdy and thoroughly dependable device highly efficient for balancing and truing operations. It assures better work . . . saves time . . . saves labor. No leveling required.

Four chilled iron discs rotate with minimum friction on sensitive special bearings, giving a quick, accurate indication of whether or not the work is in perfect balance.

Swing	Greatest Distance Between Standards	Capacity in lbs.
20 in.	20 in.	1,000
40 in.	30 in.	2,000
60 in.	30 in.	2,000
72 in.	66 in.	5,000
96 in.	88 in.	10,000



Write for Bulletin No. 4-5

ANDERSON BROS. MFG. Co., Rockford, Ill.

Balancing Ways, Roto Checkers, Hand and Power Scrapers, Spotters, Hand and Power Hydraulic Straightening Presses.

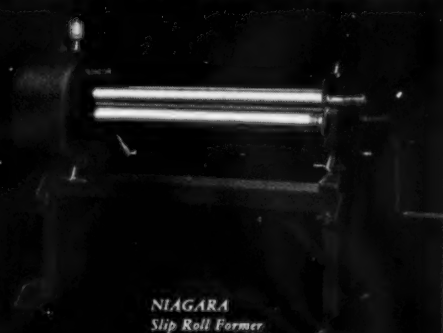


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America's Most Complete Line of
MACHINES AND TINNERS' TOOLS
FOR PLATE AND SHEET METAL WORK



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Foot Shear



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Ring and Circle Shear

NIAGARA MACHINE & TOOL WORKS, BUFFALO 11, NEW YORK

RA

The tinner's tools and machines shown on these pages are just a few of the hundreds included in the complete Niagara line. There is an economical, productive and reliable press, shear, machine and tinner's tool for every requirement for sheet metal job shops, plant maintenance departments and high production plants. Niagara hand, foot and power operated machines offer low first cost, low production cost and low maintenance cost. Write for catalogs.

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Bench Machine

NIAGARA
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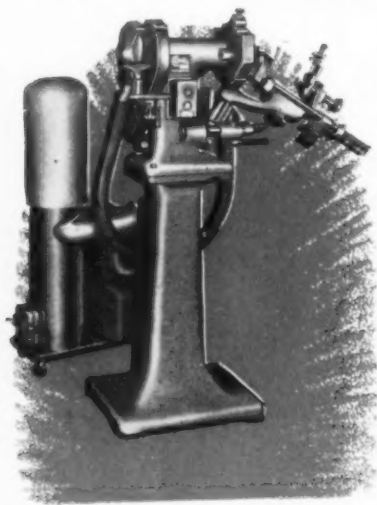
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Yankee No. 44

TWIST DRILL GRINDER



Accurately ground drills last longer, do better work and drill more holes between grinds. Properly ground drills cut faster, produce truer holes and require less pressure while drilling. This pays off in longer drill life — less breakage of taps. The No. 44 takes drills ranging in size from No. 30 to 1½" diameter and is furnished with point thinning wheel.

Yankee Drill Grinders are made in a wide variety of models to handle drills up to 4 inches in diameter. Single and double end—wet and dry—floor and bench models are available. Dust collector optional at extra cost.

Write us for the name of our dealer nearest you and ask for your copy of Bulletin MT-48.

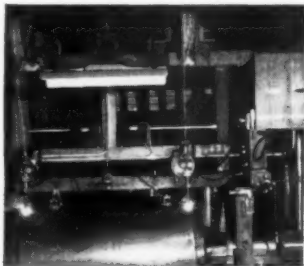
COVEL

MANUFACTURING COMPANY
BENTON HARBOR, MICHIGAN, U. S. A.

AUTOMATIC ARC WELDING SPEEDS GASOLINE TANK PRODUCTION

One gasoline storage tank 36 in. in diameter and 68 in. long is turned out every two minutes at the Dayton Pump and Mfg. Co., Dayton, Ohio, thanks to automatic arc welding equipment and an ingenious welding fixture.

Two General Electric (Schenectady, N. Y.) WFB welding heads are mounted so that both ends of a tank can be welded at once. The welding heads feed bare or lightly coated electrodes, and maintain a constant arc voltage by the use of thyatron control panels. Two stations for operators are provided, one on each side of the fixture. These are inter-connected so that operation can be controlled from either station.



After the casing and headers are loaded into the fixture, a hydraulic ram presses the headers onto the casing to provide a tight lap joint. The tank is automatically centered in the fixture, and the entire mechanism is rotated.

A pushbutton starts travel and welding at the same time. An air cylinder at the top of the fixture raises and lowers both welding heads at once. A limit switch is adjusted to stop operations after the weld is completed. Ground connections are made through two riding rolls which contact the casing a short distance from the arcs. This feature reduces interference from magnetic arc blow.

Longitudinal seams are welded on another fixture, also using a WFB welding head.

MEASURING METALLIC GRAINS

A contribution to the search for better metals and by-products of his metallurgical studies is the new grain size comparator developed by F. C. Hull of the Westinghouse Research Laboratories. Consisting of a ground-glass screen hinged to an illuminating unit with a slotted wooden frame, it is easily attached to a standard metallograph. It provides for counting the grains in a certain area or estimating their extent by comparison with a series of standard photographs.

To determine the grain size of a particular specimen, a polished and etched sample is placed on the stage of the metallograph and projected in magnified form on the glass screen. Its granular boundaries can be seen in clear, map-like form. A transparent slide of a known, standard grain structure is



slipped into the wooden frame and illuminated by incandescent light. The magnifying power of the metallograph is then changed by extending the bellows until the unknown image matches the grain size of the standard. The mount of adjustment needed is read from a scale on the metallograph, and grain size of the unknown specimen determined by reference to a standard raph.

Put the "POCKET SIZE MACHINE SHOP" to Work!

**Moto-Tool No. 2
With Emery Point**

\$16.50

Dremel's improved Moto-Tool . . . the little electric grinder that does big jobs . . . can save you hours, by speeding up work now being done by hand. Invaluable for sharpening taps, drills, gauges, chisels, tools and cutters (without tearing down "set-ups").

Dremel Moto-Tool is a "war veteran" . . . used by all branches of the Armed Forces in far-flung repair bases . . . helped to set production records at General Electric, Westinghouse, Remington Arms, Ford, Nash-Kelvinator, Northrup, Douglas and other plants.

LOOK FOR THESE MOTO-TOOL FEATURES

- Housing has "pencil-type" finger grip
- Instant-action, wrenchless chuck
- Oil-less, sealed, trouble-proof bearings
- Patented automatic chuck lock pin
- Oversize armature shaft, hardened, ground and polished
- 110 volt, universal type (AC-DC) motor
- Easily replaced commutator brushes
- About 27,000 R.P.M. cuts cleaner
- Saves cutters
- Sliding snap-type switch
- Handy hanger hook
- Cord protector
- Sturdy, shockproof bakelite housing
- Dust-filtered air-cooling system
- Weighs only 13 oz.
- Shaped to fit the hand
- Dynamically balanced for vibrationless operation.



**Approx.
27,000
R.P.M.**

MOTO-TOOL KIT NO. 2



**With 23
Accessories
\$23.50**

**PREWAR
PRICES
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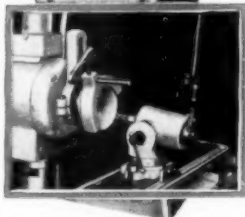
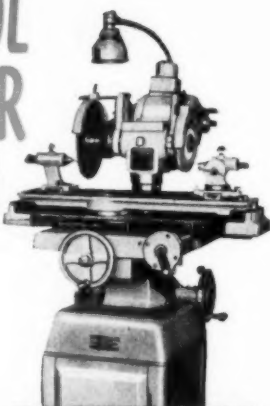
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INVENTORS SPUR BRITISH INDUSTRY

According to the British Information Service, 30 Rockefeller Plaza, N. Y. 20, a resourceful mill owner in Yorkshire, England, center of the woolen industry, has applied his knowledge of radar, picked up during the war, to inventing an electronic meter for measuring the moisture content of textiles. His simple gadget replaces the old 'rule of thumb' method by which textile workers felt the cloth with their hands as it came from the machine.

Instead of drying out all of the water

and then re-absorbing the normal content, the moisture meter indicates when the cloth has been sufficiently dried.

Another electronic wonder springs from a small laboratory at Walton-on-Thames, near London. It is a fully automatic machine that turns out complete two-valve radio sets, three a minute, without the intervention of human hands.

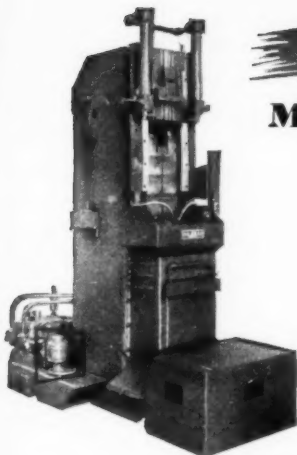
A girl at one end feeds molded plastic plates into the 70-ft. long magazine. The completed radio set pops off the conveyor belt at the other end.

Electronic 'memory units' safeguard the processes, prevent piling up on the conveyors, switch off whole series of operations in case of a breakdown and report the exact position of the defect.

One of Britain's marine engineers have found a way to run diesel engines on cheaper grades of petroleum fuel.

Mr. Lamb's proving ground has been the 12,000 ton ship "Auricula" which has completed 100,000 miles on a low grade of fuel. Her diesel engines responded exactly as if fed by higher grades of fuel. During this 16-month trial, the ship was saving about \$60 every day.

"Assuming that a ship the size of the 'Auricula' is at sea 300 days a year," Mr. Lamb estimates, "the saving in fuel expenses is \$18,000. A fleet of 50 such ships, running on low grade fuel, would save \$1,000,000 a year."



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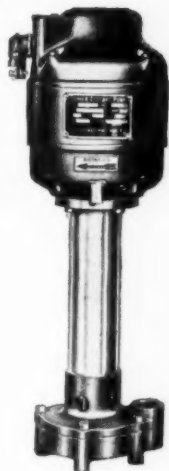
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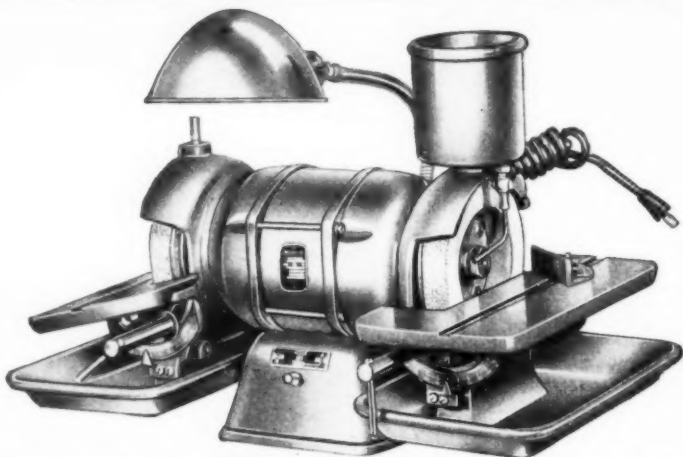


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New tools, close accuracy produce **MINING, CONSTRUCTION, OIL EQUIPMENT**

By Gerald Eldridge Stedman



Many interesting operations are performed at the Gardner-Denver Co. Aside from their production techniques, Gardner-Denver has reduced labor turnover to a mere 4% and absenteeism to only 3%. Discussed in this article are some of the production techniques employed. An interesting exhibit which reduces tool breakage is described.

ONE OF THE modern plants I visited in Denver was the Gardner-Denver Co., manufacturers of compressors, pumps, rock drills, and other equipment necessary for mining, oil, construction and maintenance industries.

Its five plants are geared to large volume production, without sacrificing quality. The manufacture of its rock drills, for example, requires an accuracy of .00025". The moving parts of these drills operate at speeds as high as 3,000 strokes p.m.

In front of the main shop door leading from the office is positioned, for all to see each day, a live exhibit of "The Cost of Broken Tools and Gages", and "Production Scrap". The actual pieces scrapped each day are placed on exhibition. The signs are changed weekly to show the loss during that week. Tool and scrap losses have fallen far below what they once were. Gardner-Denver insists on the maintenance of these exhibits as a worthy object lesson; if the exhibits are removed for a month the losses would show a large increase, figure 1.

When I visited Gardner-Denver in 1944 there were still many line shafts and much overhead machine drive. This has practically all been eliminated, ma-

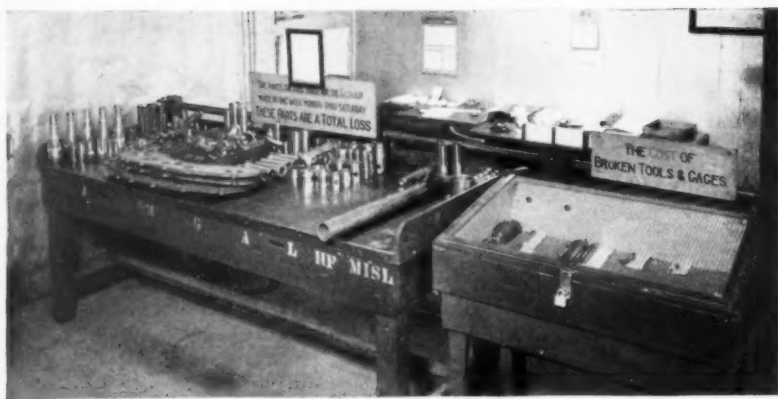


Fig. 1. Benches in main shop aisle where production parts and scrapped tools are displayed daily. This exhibit is responsible for drastically reducing tool breakage and scrap. If the exhibit were to be discontinued for a month, management believes broken tools and scrap would increase.

chines are individually driven, nearly 100 percent. The plant has fluorescent lighting, efficient blower-type heating and summer cooling, excellent dust arresting (American Dustube) and collection on all cutters, form tools and grinding. Tool shop has a separate carbide department for repair of milling, turning and boring tool bits, tends to fabricate all jigs and fixtures to gain the advantages of welded construction over castings, fig. 2. The shop contained more new milling and drilling equipment than any I have recently seen, makes use of some negative rake, but is limited in this by height and spring nature of settings which cause machines not to be sufficiently rigid for it. I noticed a new Simplex Milwaukee, 12" x 36" milling clutch jaws and chuck drivers at 131 rpm, 53/10"/min. feed. A new Heald Borematic was taking a finish cut on a distributing valve bushing hole of a motor case from cast iron material to a .00025" tolerance at

800 rpm, using a carbide boring tool, 2"/min. feed. This had a 5 micro. Heavy jig and fixture storage is in four 50' sections, 4 racks each, contains some 300 very heavy jigs, easily accessible to machine shop for fast setup, another evidence of good materials handling. Oil-dry cleaning compound is used on all aislesways, gives floors a light, non-slip characteristic. Housekeeping is excellent.

Five diameters were being ground on a rock drill drifter cylinder of carburized steel, on a new Heald grinder to a .0005" tolerance, removing about .025" stock, in one setting. The holding fixture was designed to grind four diameters at one setting and reverse to grind the last diameter on the opposite end of the work, concentric with the first four holes. Center-up was established to the original machine bore by clamp plates on the cylinder ends that locate the larger spindle of the machine, allowing the reverse to

Subject: SWISS PATTERN FILES



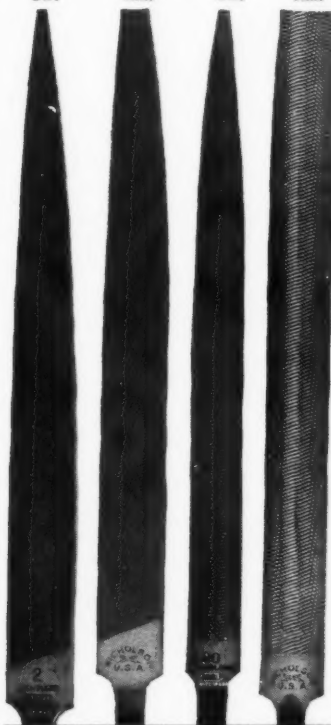
Typical comparisons of Swiss
and American Pattern files—
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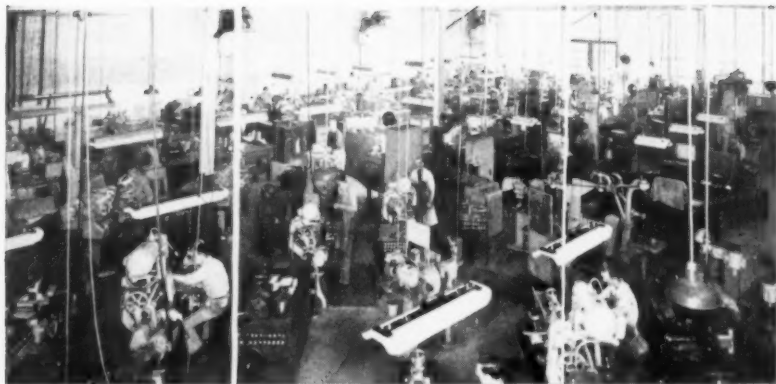


Fig. 2. A general view of the tool room at the Gardner-Denver Co. The tool room maintains 75 men, operating the latest equipment. The tool room has a separate carbide department for the repair of milling, turning and boring tools.

hold concentricity. A 2" and 3" carborundum grinding wheel, turning at 6,000 rpm is used, figure 3.

Another example was that of grinding the 2.123-.0005 fluted diam. (eight flutes) of the rock drill hammer, the grinding length being 7 5/16", a .484 radius and the base on the face of a 4" dia. being also involved. This was by 9" width wheel plunge cutting, straight feed, on a Cincinnati grinder equipped with a dial indicator to check out-of-roundness and size.

Gardner-Denver has a large die sinking department with such equipment as Die Sinkers P-W, No. 3B Universal, planer, shaper and other necessary tools for die sinking; all forgings and up-setting dies being made in shop. A large plating department is operated for cadmium, chrome, nickel, copper plating; chrome being used not only to repair tools, but the practice is now standard of plating cylinder bores. Extensive Magnaflux equipment is maintained to check welding, heat treat

and grinding for cracks and deformities. All materials handling is by tractors and electric truck, scheduling being cycled to hold minimum float delay.

The large welding department, using arc and acetylene, does much cutting and fabricating work for jigs and fixtures, as well as production. A huge parts-storage with instant inventory control is binned over a wide floor area.

No selective assembly is necessary because of 100% interchangeable parts. I saw rock drills, hoists, mucking machines, drill sharpeners, starting motors and countless items here in assembly progress.

Inspection and parts stamping occurs after machining and before heat treatment. From heat treat, the flow is again to inspection for hardness and straightness tests, to grinding, then to final inspection and finish receiving.

An interesting production item is the mine car loader which operates on a track, powered by Gardner-Denver air



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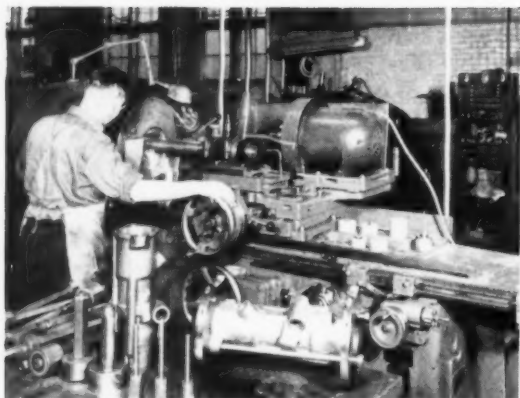


Fig. 3. Finish grinding of rock drill cylinder of carburized steel. Tolerance is held to .0005". About .025" of stock is removed.

motors which move the loader and actuate the dipper, throwing material into the mine car at loader rear, like a man shoveling over his shoulder.

These Gardner-Denver motors are also used in air hoists for scraping, hoisting, hauling, dragging — highly efficient equipment. The boring and facing

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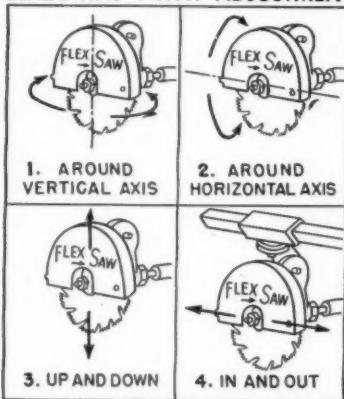
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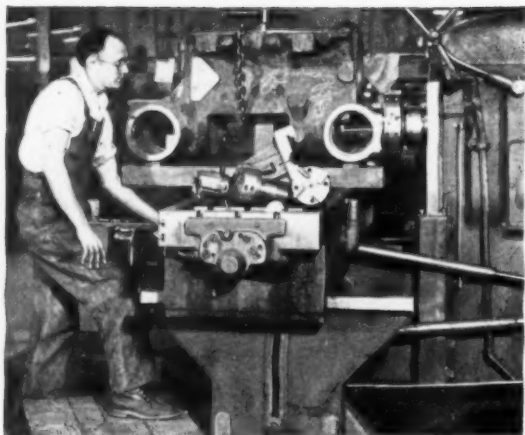
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Fig. 4. Machining of a rock drill cylinder forging. The high carbon steel is turned, threaded and recessed, using carbide turning tools at 100 r.p.m., .020"/min.

• • •

of the 800 lb., 33" x 52" mine car loader bed plate is an interesting operation. This is done on a Niles, the work being too big for the mill so the work is cast with the corners off and they are after-welded. Swing here is 52" with hole off center.

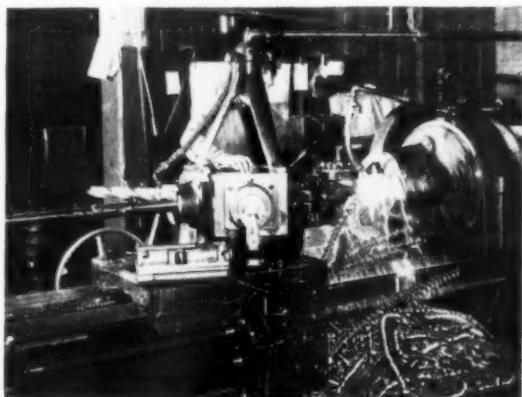
Gardner-Denver developed the alloy,

Gardaloy, which is an unusually high tensiled cast iron. I noticed an interesting operation on a Bullard Cut Master, 30", including boring, facing and turning the boss on the motor case. Machine speed was 77 rpm., feed was .015"/min. using carbide tools. The setup used five tools in the turret, two

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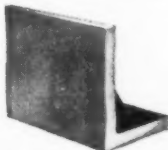
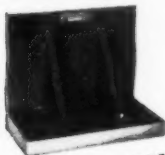
Fig. 5. Facing off the axle bearing cap boss of a cast under carriage for a car mine loader. Carbide tools are used at $4\frac{1}{4}$ " feed, 74 r.p.m.

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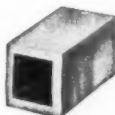


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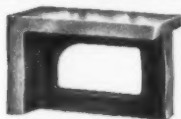
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in the side head which multi-faced back of the boss and inside simultaneously. An air motor bracket was being machined on a Niles 36" boring machine using five turrets and one side head, all carbide tools, except a unique expanding reamer. Speed was 70 rpm., feed .012"/min. Metal was cast steel.

High carbon drill steel is turned and front end is threaded to receive the drill bit on a J & L 2" turret lathe, using a Gardner-Denver chucking fixture. They turn, recess and thread using carbide turning tools at 100 rpm., .020"/min. with hand recessing to get a production of 150/8 hours. figure 4. The air operated chucking fixture operates the collet. The high speed, steel rock drill shank and punch is cam-turned on a B & O, using carbide tooling at 190 rpm., 6"/min. cam turning 1 1/4" and to a sharp point, production

being 80/8 hours. This uses a star collet with cam action on turning. First operation a 5/8" dia., second turn to 3/8" dia., cam turning 3/8" to 5/16", third cam turn of 3/4" radius and the last operation pointing the shank.

In another operation of the 3A J & L Universal screw machine involving machining of the loader axle, six tools are carried on the hex., three on the square, and two on the back stand. The operation turns the work complete, forms taper and thread. This is carbide turning and represents a lot of work in one operation. Of the 40 5/16" overall, work is on 20", using reverse in two operations involving a 3 1/4" taper from 2.664" to 2.201", using 340 rpm., .015" feed and requiring 40 minutes each part.

In the milling the loader under carriage, a 1400 lb. high tensile iron casted part, facing off the axle bearing cap boss, carbide tools are used at 4 1/4" feed, 74 rpm., to complete the work in 115 min. each, involving two axle bores in six passes, figure 5.

Sixteen tools are used in a drilling operation on a Cincinnati-Bickford; drilling, c/drilling, c/sink, tap and ream to .0005" tolerance, .687" dia. holes, work being a motor valve chest of high tensile cast iron. A Wizzard quick-change is used, tools are all high speed tool steel.

Gardner-Denver has 500 machine motors in the shop. Practically every machine operation has something unique or exceptional about it, smoothness of machined cast iron surfaces, either unusual feeds and speeds, chip characteristics, low waste and work repair, high production per manhour, long life of tool bits, or unusual technique in carbide tool repair. THE END.

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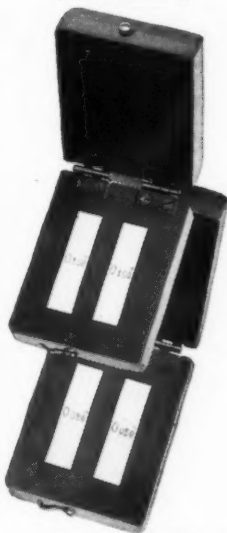


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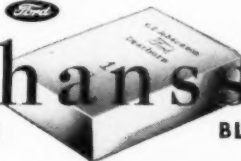
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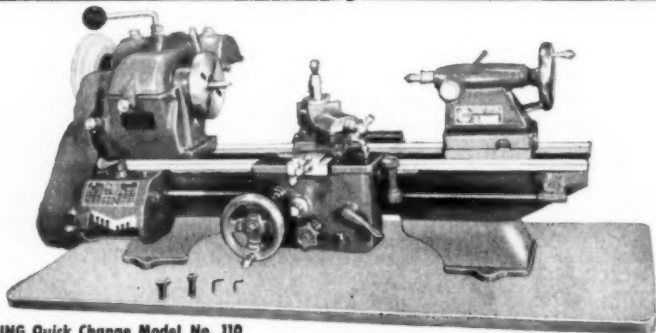
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Cams

THEIR PRODUCTION AND APPLICATION

by John E. Hyler

Number 4 in a series of 5 articles. Previous instalments appeared in January, February, and March 1948.



Rise and fall of cams must be checked accurately, for which sensitive instruments are available . . . Roller and ball bearings are frequently used as contact points on the follower . . . When cams are too large to be made by conventional milling machines, special milling machines must be employed, one of which is described and illustrated in this article.

THE MOVEMENT of a cam follower can be no more accurate than the profile of the cam itself. Therefore, wherever peripheral cams are employed for producing highly accurate motions, it is important that the cams themselves be carefully tested for accuracy. One must check the exact amount of rise or fall existent at each station on the cam, or rather between stations. Hold the cam and rotate it on its axial line, without the slightest degree of deviation in the rotation, through an exact number of degrees and minutes, then check the periphery with an accurate, sensitive dial indicator.

An accurate device for holding and rotating parts on their axis, both with regard to runout, and amount of arc rotated, is an optical master inspection dividing head, developed for the checking of angular spacing. The ball bearing spindle of this device is accurate, for runout, within twenty-five millionths of an inch, and accurate, for rotation, within two seconds of arc. The company making the optical master inspection dividing head provides a cam rise gage or comparator, especially designed for use with it. See figure 1. The cam comparator incorporates a cam follower, which

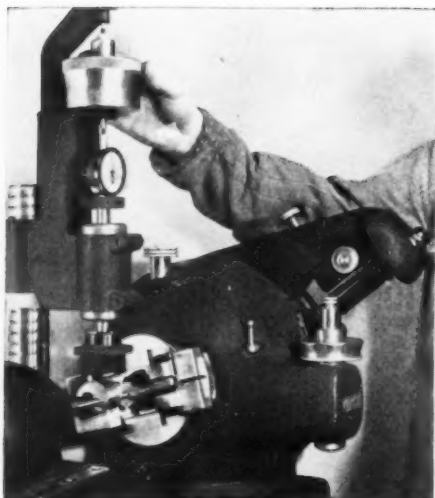


Fig. 1. The optical master inspection dividing head together with the cam gage or comparator, designed for use in connection with it. The hand of the operator is moving the micrometer, which is mounted in between two dial indicators, only the extreme lower rim of the upper indicator being visible.

bear directly down upon the top of, and is lifted or lowered by, the revolving cam being tested. The weight of the cam follower maintains close contact. Where relatively long and slender camshafts are to be tested, special adjustable jack supports, or steady rests under the shaft, insures the weight of the cam follower will not cause downward springing in the shaft, thereby affecting accuracy. On the short camshaft, figure 1 no such auxiliary support is needed.

The cam comparator shows the amount of rise or fall, and error, if

any, at each station on the cam. The instrument employs two .0001" dial indicators. One of these indicators is in full view in the illustration, but the top one of the two can be seen only in part. To check a cam, first locate the starting point on the cam. Then set both indicators, the micrometer, and the dividing head at zero. The micrometer, shown being moved by hand, is then set to the prescribed amount of rise (or fall) for station one, and the dividing head is rotated through the required number of degrees and min-

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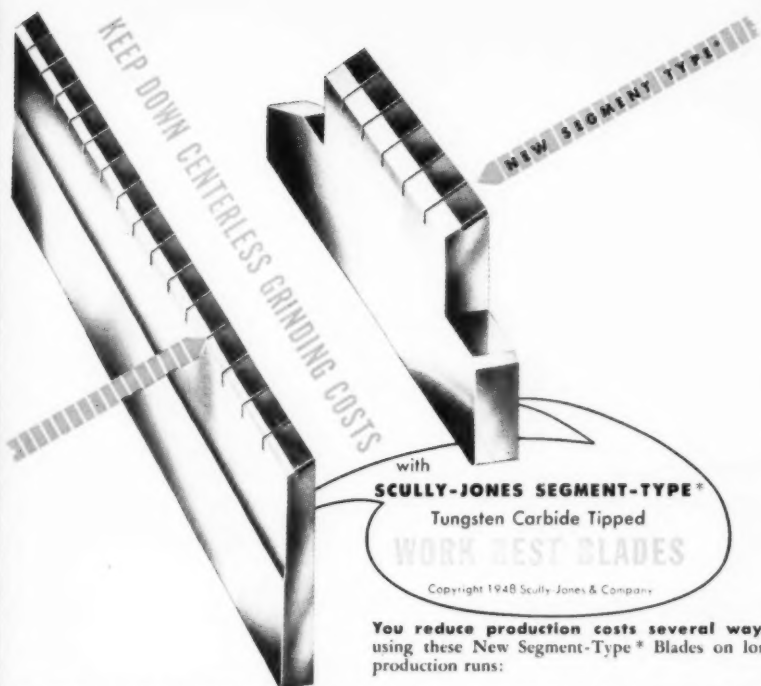
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utes. Any variation from the specified rise or fall, at station "one", is shown on the bottom indicator. The above-described procedure is repeated for each station on the cam. The top indicator is not touched after the initial setting, as it registers the accumulated amount of rise (or fall) for all stations. In some cases, as for instance where it is necessary to check peripheral cams mounted on a large disk of the type found in radial engines, cam comparators for use with the same type of dividing head are made special, to suit the work, but the mechanical principles involved remain the same.

Two Types of Cam Followers

There are two different types of cam followers, with reference to their mechanical action: the follower with a straight-line action, usually operating in a slide or guide; and the pivoted type of follower, whose contact point moves in a circular arc. Granted that more complicated actions than these may be provided, it is seldom that they are desirable or necessary. There are also different kinds of followers with particular reference to the type of contact point they employ.

Sometimes, a cam is used to actuate a bar, either in a straight or a pivoted motion, referred to as a bar follower. We have seen cams arranged in multiple, in a straight line, connected by a long pitman rod, and with that pitman rod connected to an air cylinder piston,

used for operating a long straight clamp jaw. Some clamp jaws are incorporated in a modern sash clamp, used in the woodworking industries, this is an interesting instance of cams connected and operated in unison against a bar follower, providing a multiple-point support for the clamp jaw. This makes it proof against deflection under pressure.

By using two different and unlike cams at the two ends of a bar follower, and timing them together properly, any desired motion, simple or complex, can be imparted to the bar follower within the plane of action. It is used in the woodworking industry, where a long cutterhead spindle, mounted across a chair seat saddling machine, theoretically forms the bar. Underneath is a camshaft, with unlike cams at the two ends, raising and lowering the two ends of the cutterhead spindle, obtaining a required saddling cut in the chair seat.

There are special cam followers, such as those with mushroom-type heads, flat-footed followers, etc., but in most instances, the contact point on the follower is a roller of some kind. Using a roller on the end of a cam follower to bear against the cam, greatly reduces the friction between the cam and the follower. The material of which cam rollers are made depends on the duty they are to perform. Cam rollers of lignum vitae, a hard tropical wood, are sometimes used where the roller must be exposed to water, or other li-

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quid. Lignum vitae is self lubricating in the presence of water, but otherwise is not particularly recommended for the purpose.

Metal cam rollers, and their pins or studs must be made with care, and be highly accurate, and should always be ground after hardening. Relief should be ground into them, to reduce friction resulting from the turning of the roller. Where a cam roller is to be run in a groove, milled into a cylindrical cam, it is usually made with a conical contact rim, rather than cylindrical, the sides of the cam groove being bevel milled to match. This allows the roller to operate in the groove with less friction, there being compensation inherent in the beveled groove form, for the helical direction of the groove.

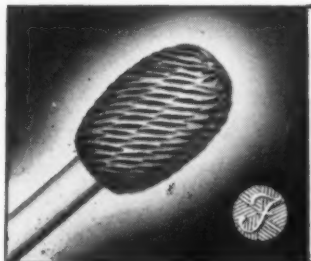
It is evident that in using a roller of conical form, end thrust will automatically be generated in that roller; therefore, the degree of taper on the conical roller should be the least that will offer proper clearance, on that particular portion of the cam groove which is subjected to the heaviest work. Also, there should be a thrust collar on the roller stud of the follower. If the follower is large enough to permit it, a ball thrust bearing arrangement can be obtained at this point, by milling a ball race in the thrust collar, and a mating race in the large end of the cone-shaped roller, thus incorporating an actual ball thrust bearing in the device.

Ball Bearings as Cam Rollers

One question arises: cannot an anti-friction bearing be directly used as a cam roller, the inner race of the bearing remaining stationary on the pin or pivot, while the outer race contacts with the cam periphery, and rolls thereupon? This can be and has been done in a large number of instances. Ball bearings were used as followers in radial piston pumps, the pistons being radially disposed on a rotor, turning within an internal cam with an elliptical contour.

However, care must be taken in applying ball bearings to cam follower layouts where severe shocks are imposed. Such followers should be run only on cams that have been ground to a smooth finish. In some cases, a standard ball bearing can be pressed into a cup-type member, the latter serving as the actual contact member for the cam. Ball bearing manufacturers have information on the allowable maximum load that can safely be imposed on any of their bearings, when used as a cam roller.

Cam follower roller bearings have also been made available by some. These have a much greater load-carrying capacity for a given overall width. They have been favored where an anti-friction cam roller is desired to stand considerable intermittent shock. However, one should use all possible care, on any cam layout, to eliminate shock in the mechanism as fully as possible.



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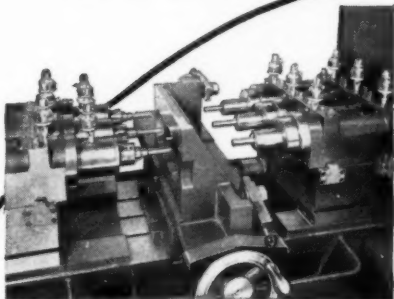
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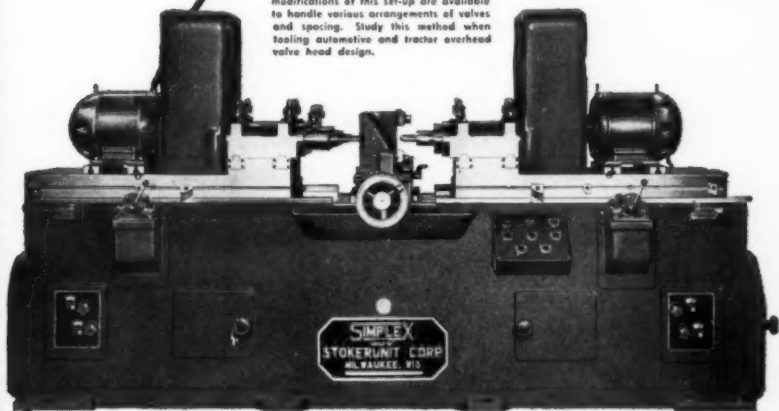
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Fig. 2. A large barrel cam for use on a large chucking machine is shown in process of being milled. The former can be seen in large part at the bottom left, below the hand of the operator. This is a cam drum to which the cams are applied in segments, providing easy changes in cams for job changes.

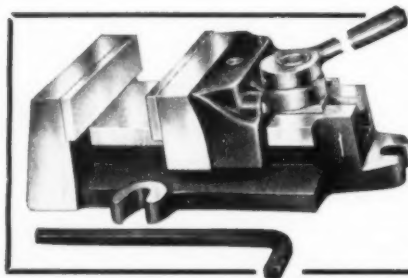
siderable impact. This is one aspect of proper performance that should always be carefully checked in a fast-rotation peripheral cam.

Machines For Cam Milling

Until now, nothing in particular has been said about machines especially designed for cam milling, except those machines which have particular reference to screw machine cams. There are, however, many highly special cams which must be made, and also many that are too large in size to admit of milling by any of the methods heretofore considered. While different types of machines have been developed for this general purpose, we shall consider only one of these.

Sometimes, by reducing the weight of a follower, or by increasing the force of the spring or weight which holds a follower to the cam as the return stroke begins, shock that might otherwise be troublesome can be avoided. On some highspeed cams, where the cam curve drops back abruptly, the cam may actually leave the follower or roller for a brief interval. Then, as the cam roller catches up, it strikes the cam with con-

The machine may be thought of as being made up of two principal connected parts, namely, a cutter spindle and a work-holding head. The machine frame incorporates a column at the left, with a vertical slideway, to provide vertical sliding action for the horizontal cutter spindle and its cutter. It also incorporates a base at the right, made integral with the column, on top of which is a horizontal slideway, mount-



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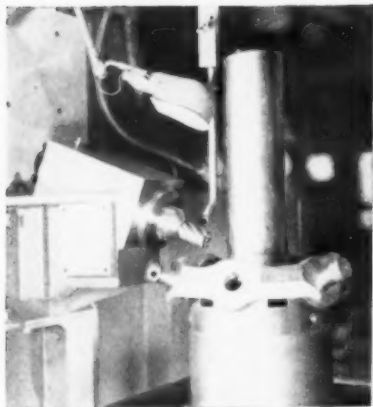


Fig. 3. A special arrangement of the cam milling machine, in which the cutter is held in a tilted position for profiling the top and bottom of the rim on a Pratt & Whitney engine propeller reduction gear shaft.

• • •

ing the work-holding head. This work-holding head incorporates a rotary work mandrel. Thus, the work head can be adjusted toward or from the cutter spindle, to cause the cutter to mill to the prescribed depth, on different types of cams, figures 2, 3, and 4.

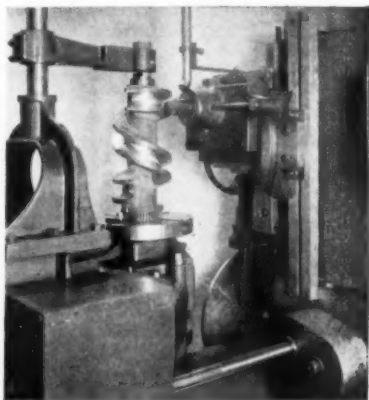
At the bottom of the column carrying the vertical slide and its horizontal cutter spindle, is a cam shaft, upon which is mounted a peripheral former, designed in such manner as to automatically raise and lower the spindle-carrying slide as necessary, to mill the required groove, contour or periphery on the cam being produced. Facilities are provided for adjusting the initial height of the cutter spindle, with regard to the starting point on the former being used and the cam being milled, so it will be exactly right in each case. The mechanism for revolving the work head mandrel obtains power and motion from a common source with the

revolving former, which governs the vertically-sliding action of the milling spindle. Therefore, they keep exactly in time, according to a predetermined rate. However, a clutch is incorporated in such manner that the work head mandrel can be temporarily disengaged. This allows rotary adjustment of the work spindle, to bring it to the correct starting point, in relationship to the cutter spindle.

The work head can be turned through an angle of 90 degrees, to bring the work mandrel into either a vertical or horizontal position. When milling plate or face cams, the mandrel is turned into a horizontal position for the purpose. The mandrel is turned into a vertical position in any instance where it is desired to mill cylinder cams, or others of similar nature. For such,

• • •

Fig. 4. Looking from the back of the special cam milling machine, a two revolution indexing cam is in process of being milled. The overhanging outboard support bearing can be seen applied to the top end of the mandrel. The splined shaft which transmits power from the column side of the machine to the work head side can be seen in the foreground.



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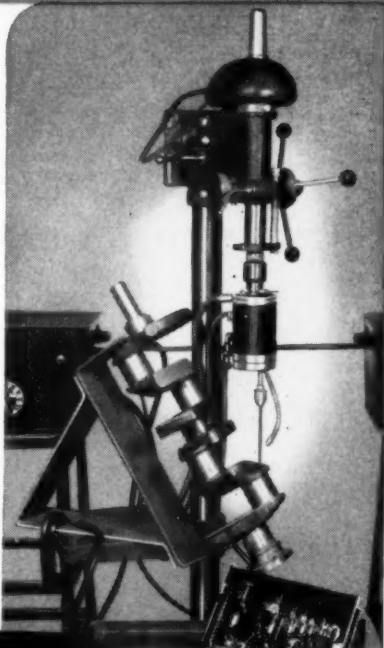
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an overhanging, outboard support is used, to hold the revolving top end of the work arbor or mandrel true, except in rare cases, where work of large diameter and relatively short axis is being handled. It should also be noted that special cross sliding attachments are available, which provide, instead of the rotary motion of the work mandrel, a cross sliding motion to a large, flat, vertically-disposed face plate, to which sliding or flat cams can be attached. Thus, sliding cams may also be properly milled on this unit. Special eccentric grinding attachments, special tilted arrangements for the milling cutter spindle, and other special layouts can be and have been provided, on this machine, for handling special work other than cam production as such, even though the machine is primarily designed and provided as a cam milling unit.

(Photographs courtesy Rowbottom Machine Co.; and Vinco Corp.)

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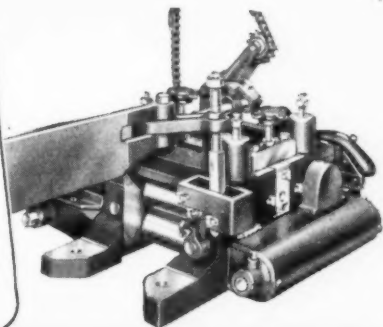


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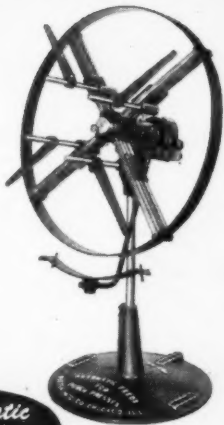


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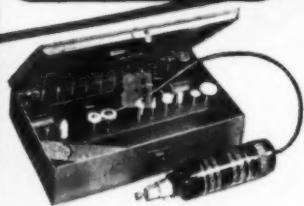
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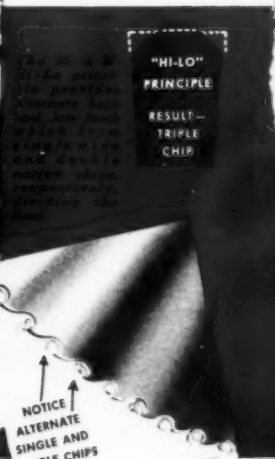
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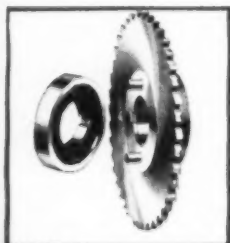
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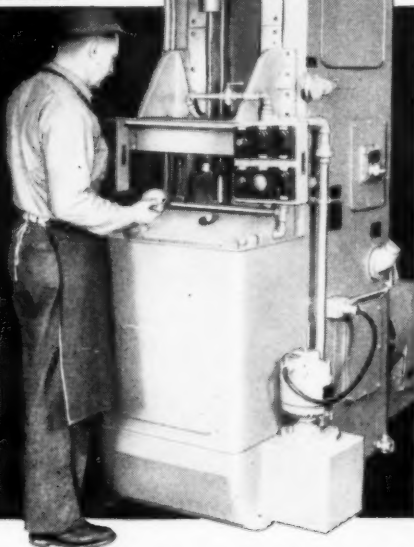
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Letter from England



Written for the **MACHINE** and **TOOL BLUE BOOK** by Robert Hutcheson, Editor of **MACHINE SHOP MAGAZINE**, London, England.



There continues to be a certain amount of industrial unrest and for the past two weeks there has been a strike of ship repairers on the Merseyside. The cause of the strike is the decision of the employers to stop the system of payment by results. The strike began in the yard of Harland and Wolff, but since then the number of strikers has increased. So far there appears to be no sign of settlement.

Although Britain's economic stability revolves round her coal supplies and in spite of the fact that the mines are now nationalised, a strike of about 400 shotfirers and other key workers in some of the Yorkshire pits has resulted in the stoppage of work of over 13,000 miners. At the moment the position seems to be in a state of flux; work has resumed in certain pits while extended striking of shotfirers in new pits has put other men out of work. The strike started as a protest against alleged delay in the settling of claims for increased wages.

Coupled with news of strikes in the mining industry we learn that for 7 weeks or so the production of coal fell below the average of 4,220,000 tons that is required to reach the Government's target for coal output. Incidentally, during this period there has been a decrease in absenteeism.

A report issued by the Chamber of Ship-

ping of the United Kingdom criticises the National Coal Board. Increased prices of coal have resulted in an increase in British shipping freight rates of from 5 to 10%. Not only is this increase criticised but the suddenness of the rise is deprecated, as the short notice given of the intention to increase prices does not give the shipping industry adequate opportunity to adjust itself. The report also contains comments on the Marshall Plan as regards its attitude to shipping. According to the report it is vital to Britain that we should re-create all classes of our Mercantile Marine and at least bring it up to the pre-war tonnage. The capital costs involved have prevented many ship owners from building and the report comments on the fact that, unlike the years following the 1914-18 war, prices show no signs of diminishing.

While the Mercantile Marine would like to expand the Navy is cutting its next year's costs by £43,700,000 to £153,000,000. Of the total about one third will be spent on ship building, repairs and maintenance work. No new vessels will be commenced but work will continue on those already under construction.

We understand that 6,000 Anglia and Prefect cars and 10 horse power cars are to be built at the Ford Works, Dagenham, for export to your country. The sale of these vehicles will bring over £1,000,000 worth of dollars to Britain. Mr. Henry Ford

said that our sports cars are particularly popular in the United States because the American motor industry does not produce an equivalent model. Furthermore, traffic congestion continues to increase in American towns and this tends to create a demand for the smaller vehicles.

Although the engineering firms which we visit continue to complain about the lack of steel and other materials, steel production in January reached a record and was higher than the average monthly output required to reach the total of 14,000,000 tons set by the Government for 1948. It was actually at the annual of 14,589,000 tons. Pig iron production was also increased.

Probably everybody in the country will be affected by the latest order of the Government which pegs the maximum price of many consumer goods. A vast number of articles which are thus to be price controlled are engineering products and include articles such as nails, nuts and bolts, refrigerators, washing machines, electric clocks, aluminium pots and pans, wireless,

and television sets, cameras, electric lighting and similar fittings, and typewriters, calculating machines and other office equipment. Just what will be the effects of this attempt to stabilize prices cannot be foreseen at the moment. It seems to be one of those things which will have to be tried in practice before its results can be judged.

In my last letter I referred to the building and trial run of a Diesel electric locomotive built at Derby. The first passenger express train to be hauled by a Diesel electric locomotive on the British Railways has just gone into service between London and Derby.

The original Kitty Hawk, the bi-plane used by the Wright brothers in 1903 to make the first flight in a heavier-than-air machine, has been for many years in the Science Museum here in London. This machine is now to be returned to the United States and it will be replaced in the Museum by a replica which is being built at the De Havilland Aeronautical Technical School at Hatfield.

In contrast to this, Norway has just ordered from Britain four Vampire jet fighter aeroplanes.

Schemes for the improvement of education are much to the fore in this country today and the Minister of Education is considering a report on our technical colleges. The report suggests that many of our technical colleges could make a large contribution towards the manpower required by science, and the report recommends that the status of these colleges should be raised and that adequate facilities should be made to enable them to



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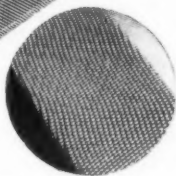
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grant various degrees in technology.

Several of our leading motor car firms have been compelled to stand off large numbers of employees, and Mr. G. R. Strauss, Minister of Supply, has warned the motor industry that those firms that cannot produce a large enough number of vehicles for export may have to turn to other work. The export target set is three quarters of the output and firms that have not reached that target will be given six months in which to attain it. Steel and other materials, Mr. Strauss contends, must go to firms that are exporting, even though it means other firms will have to cut down.

The Foreign Offices have issued a report on the entry into Britain of foreign workers. At the outbreak of war some 80,000 refugees had come into the country from Germany, Czechoslovakia and Austria. The majority of these people have settled down here permanently. By the end of last year the Government had undertaken responsibility for 40,000 displaced persons recruited from Germany and Austria and these, to-

gether with about another 40,000, are entering the country at the rate of about 1,200 per week. THE END.

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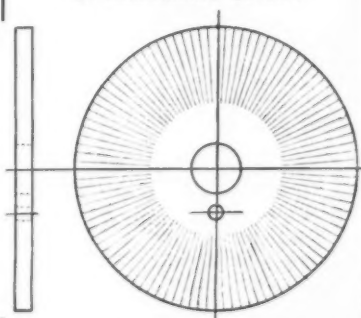
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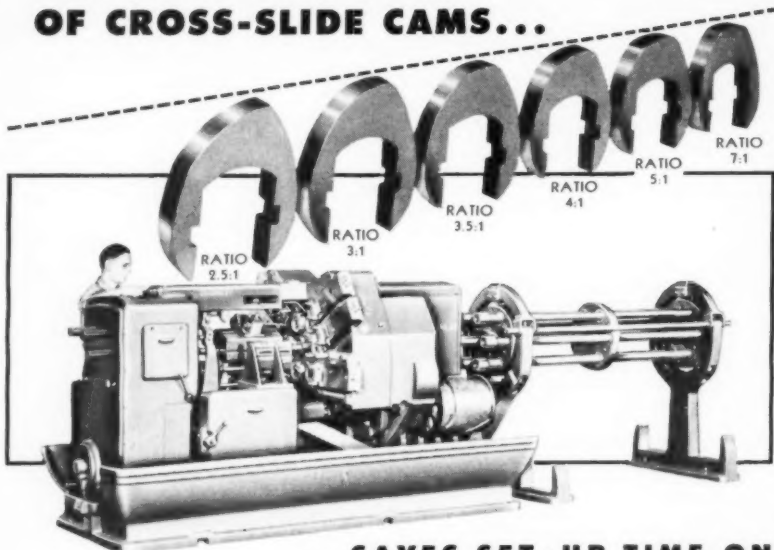
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SALIENT FEATURES OF



Handwheel Design

By H. F. Williams



Number 3 in a series of 4 articles. Previous instalments appeared in December 1947, and February 1948.

Handwheels can be balanced at the rim or near the hub...Modernistic designs have been incorporated into many handwheels gracing new machine tools...Sometimes it is necessary to manufacture extra large handwheels: they can be fabricated or of solid type.

THERE are several methods used in counterbalancing at the rim. In Fig. 76, on a 6-spoke handwheel, the weight extends over three spokes, blending into the centerlines of two spokes, allowing the center spoke to terminate against the weight. The finished periphery of the wheel in this design extends around only 180° and the weighted rib is recessed only 1/16" below this finished surface. While the handle must be directly opposite and central with the weight, it is at the end of a spoke, reinforced at the hole for the shank of the handle.

The 3-spoked handwheel in Fig. 77 is weighted the same, the difference being in the finger grip openings. All the fingers of one hand can be accommodated; in the two small openings in Fig. 76 this is not so. In Fig. 78 the counterbalancing mass is of the same thickness as the spokes, with a small opening between the spokes. Four openings remain for the fingers. The handle is always positioned at the end of a spoke when an odd number of spokes is used, thus, with an even number of spokes, the operating handle is midway between two spokes. In Fig. 76, the handle is at a spoke because the counterbalance runs over three spokes rather than connecting only two. This is borne out in Fig. 79 where the counterbalancing weight at the rim embraces only two spokes.

Fig. 80 is a combination rim and spoke counterweight. The side surface of this metal is faced off tangent to the rounded surface at the outside of the rim. It does

not interfere appreciably with finger room and can be used on a 5 or 6-spoke handwheel.

The third method of counterweighting a balanced handwheel is by adding metal at the hub to offset the volume of metal in the handle. In Fig. 82 the hub is thrown off center, that is, that part of the hub within the width of the rim. If the hub is long, the entire length does not have to be weighted off center. Plenty of finger room is available with this treatment. The handle must be midway between two spokes for this 3-spoke handwheel. In another design of a 3-spoke wheel, the operating handle joins the rim at a spoke, made possible by throwing the eccentric, between two spokes instead of at one spoke.

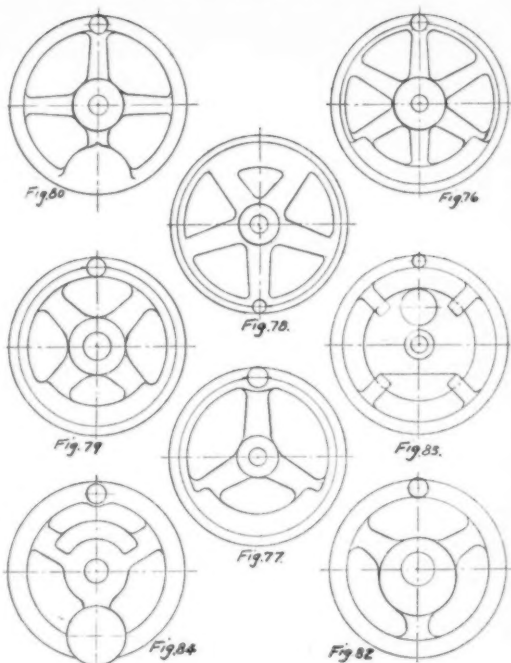
Sometimes a handwheel has a piece of mechanism attached to the central flange or hub, Fig. 83. It is represented by the circle at the upper vertical centerline. The operating handle is at the top, midway between two spokes, which are of the right-angled variety, extending straight from the hub and bending upward to the rim. The counterweight, heavy enough to offset the weight of both the handle and the additional auxiliary mechanism, lies between two lower spokes on the center flange.

In Fig. 84 the added mechanism is at the bottom, the weight being offset by counterweight and handle. The weight extends from center to center of the two upper spokes; the lower spoke supports the auxiliary mechanism.

Unbalanced Handwheels

Diametrically opposite from the balanced type of handwheel is the one in

Counterbalancing At the Hub



which unbalance apparently does not matter. On one machine the handwheel is shaped like that shown in Fig. 73 of the previous article—Part II. This is a three-spoke wheel, two spokes being of conventional size, the third being a wide one. In the design being discussed, instead of the operating handle being mounted opposite this wide spoke, it is placed directly in the center of the wide spoke.

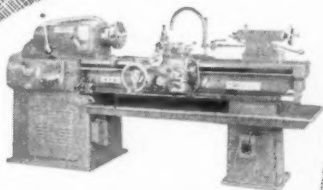
In another 3 equally sized spokes handwheel the designer placed the handle opposite the one far spoke or between two adjacent spokes, instead of at junction of rim and spoke.

Another application of unbalance occurs when a solid flange is used instead of spokes. There is a hand opening in



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the flange between the rim down to midway between the hub and rim. The wheel is out of balance even before the handle is attached. The position of the handle in this instance is diametrically across the handwheel from the grip opening, thereby throwing the wheel even more out of balance.

Balanced handwheels are commercially obtainable, finished ready to mount if hub bore specifications are submitted. These wheels are furnished with either straight or disked spokes in sizes of 5" to 12" inclusive with or without handles. Either 3 or 6-spoked wheels are counterbalanced at the rim as previously explained.

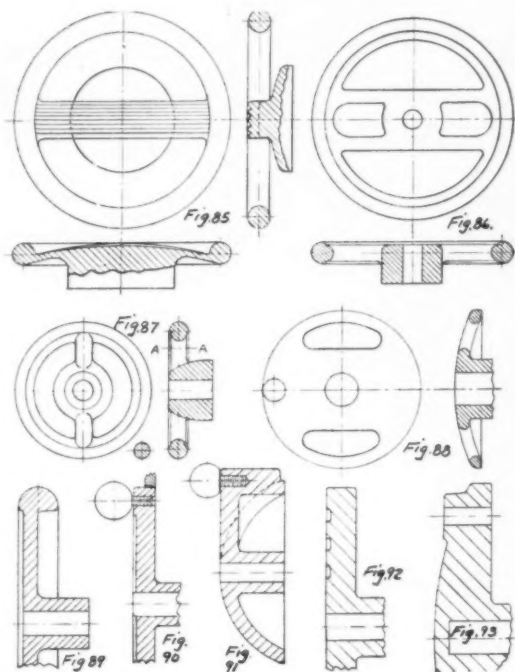
Modernistic Types

Many designers are adopting modernistic handwheel shapes, and some very attractive designs have appeared.

Fig. 85 is of the 2-spoked type. Spokes have a curved upward sweep toward the middle of the hub which is rounded off on the front face. The tops of the spokes are fluted, dying off at the rim, which is turned and polished. The polished surface running into the buffed inner surface of the rim. Cross sections show the hub joined to the spokes. The bore of the handwheel does not go all the way through.

In Fig. 86, wide spoke of a two-spoked wheel is tangent on both sides to the hub of the wheel. An opening on either side of the hub gives the effect of four spokes. Spokes are of considerable thickness, being the same as the diameter of the rib on the inside of the rim. The outside of the rim is finished 180° around.

Fig. 87 is a small handwheel having two round spokes of round section at A-A. They join a projectile-nose-shaped hub flattened off at the front face. While the diameter shown is necessary for the hub where it contacts its mating piece, by curving it inwards at the



front, takes away any clumsiness that might result from a straight cylindrical type of hub. The hole is bored through the hub. The rim is polished while the spokes, rim rib and hub are lacquered.

Curved front surfaces are being incorporated in handwheel design with pleasing results, Fig. 88. The disked face is pierced by two openings large enough for four fingers. The edges must be nicely rounded. A small hub at the left

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is just high enough to make drilling and reaming for the spindle of the handle practical. No attempt is made to balance the handwheel. This type of wheel need be finished only at the outside diameter for true running and on the rear face, the curved front face being painted or lacquered or otherwise decorated. The The bore and handle hole are reamed

Figs. 89 and 90 are the so-called flush types because of the way in which they appear on the machine. The periphery of the one in Fig. 89 is rounded and nests into an opening so that the front face is flush with the wall of the machine. It is solid-flanged instead of spoked, this flange having no openings. The rim has a small boss for the handle.

The front face of the wheel in Fig. 90 is not quite flush. The wheel enters a hole in the machine, the whole thickness of the rim is not visible after it is assembled. Outside of rim and front face at rim are finished, center portion of solid flange is painted. This handwheel has a free-turning knob which eliminates excess overhang from the front of the machine.

Fig. 90 has a pronounced curve on front surface. The hub for the operating knob is a rib extending past the outside diameter and tangent to the curved face on top. The knob is flattened off to keep it close to the wheel. It is of the free-turning variety.

An ordinary disk of cast iron upon which is mounted a hub is Fig. 92. It is not finished on the outside diameter, being chucked from the surface in a universal chuck and the hole bored in the hub. In the front face are three circular grooves also cast in. When the wheel is being painted the

grooves have a few shades lighter paint than is used for the rest of the machine. A handle is used although it is not shown. The outer groove is not continuously round but stops either side of the handle hole.

The curved front surface of the wheel in Fig 93 and its handle is the only part protruding from the front wall of the machine. It is solid and has a slightly raised boss for the handle. The hole is not bored through for the central shaft. The outside is finished to run true in a rough bored hole in the bed and the rest of the wheel is painted.

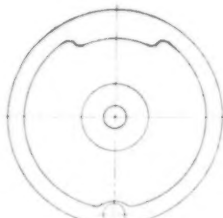


Fig. 81



Fig. 94



Fig. 95



Fig. 96

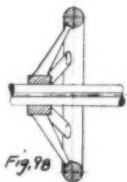


Fig. 98

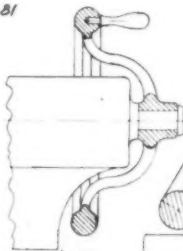


Fig. 97

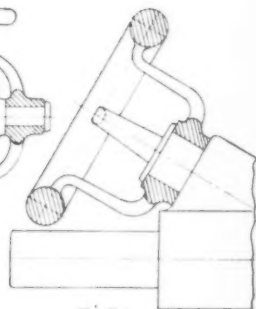
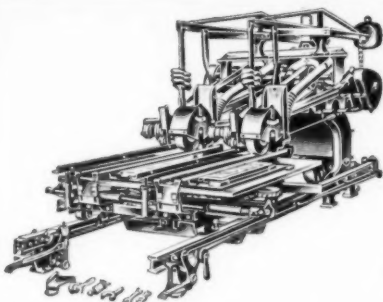


Fig. 99

Disked or offset handwheels usually serve a utilitarian purpose. Close proximity of wheel to bed or other mechanism, sufficient hand and finger room, excessive reach for the operator, clearances of protruding parts, nesting of

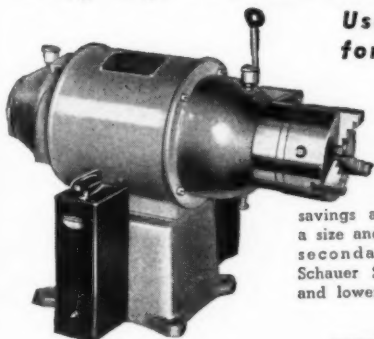


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clamping devices at the handwheel hub, etc. are reasons why hand wheels assume extended shapes.

Fig. 94 is used in a vertical position. The right angle spokes curve downward into the rim to allow the operator to stand on ball and heel of foot instead of having to reach the wheel from tip-toe. The wheel has six spokes of rectangular section. There is no handle in the rim, the operator grasping the rim between the spokes.

Another method to avoid operator over-reach is Fig 95. The handwheel has six straight line spokes. Six holes are drilled and reamed, at an angle approximately 30° off the vertical in the rim opposite the spokes. Pin handles, rounded off at the ends are pressed in. Formed handles can be used if hand slippage is to be considered. With the use of handles better leverage can be obtained than with a plain rim, especially when two hands are required.

Sometimes a handwheel is to be locked when some particular position is reached. The backing mechanism is controlled from the front of the handwheel, Fig. 96. The locking knob is shown against the hub. The four spokes are disked enough to nest the knurled knob. Spokes are as straight as possible, curving in only at the rim.

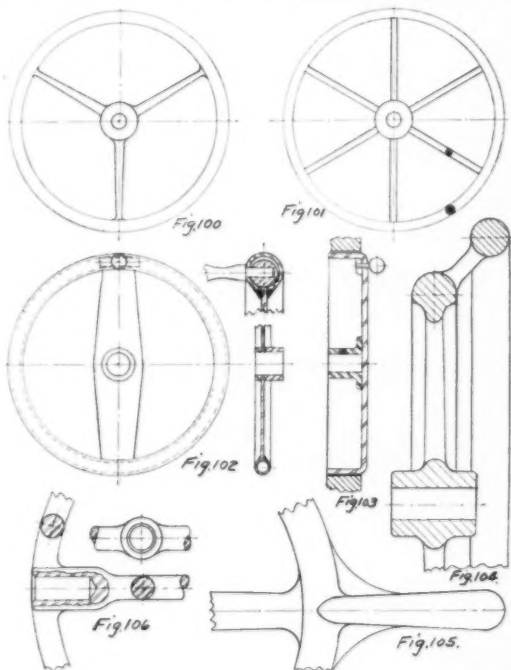
In Fig. 97, the spokes are curved to surround the bearing boss of the unit. The handwheel is manipulated by the rim with the operator's right hand; by disk ing inwards excessive reach is avoided. It is also a close-coupled assembly which facilitates appearance by reducing excessive overhang. The operator can use the handle by approaching the wheel from the

right. This handwheel has six ovally-shaped spokes.

Fig. 98, is adjustable along the key-wayed shaft. Although not shown, it is fastened to the shaft by a brass-ended screw in the hub. By disk ing 6 spokes screw is easily accessible. The key is fastened in the hub of the wheel.

In Fig. 99 bearing overhang or spread can be reduced by close-coupling the wheel to the housing. Four spokes are tapered both ways, thickness and width. No operating handle is used. The rim just clears the protruding shaft.

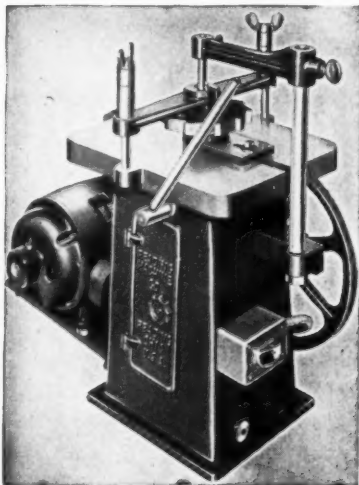
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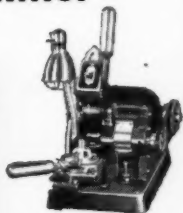
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ing wheel, Fig. 100. Sometimes there are three spokes, sometimes four. On some of these rims, there are finger-fitting corrugations, scallops or raised ribs to facilitate turning. Some have wire cores in the plastic or hard rubber rims. Fig. 100, with thin and narrow spokes and a very small diameter rim, was undoubtedly made of steel.

Fig. 101 is made entirely of steel rod, except the hub. The rim stock is quite small in diameter while the six spokes are still smaller. Six holes drilled radially in the small hub accommodate the spokes which are welded to the rim. The wheel is comparatively light in contrast to cast iron with its larger sections.

For extreme lightness, the design in Fig. 102 cannot be surpassed. The rim is made of a piece of steel oil tubing, bent round in a tube bender. The joint at the top center is welded together over a pin of somewhat smaller diameter than the inside diameter of the tube. This pin strengthens the union of both ends of the tube, and is drilled out crossways for the spindle of the handle. The spoke is a thin piece of cold drawn steel or sheet metal, welded at the rim. Two cylindrical pieces are welded at the center to form the hub.

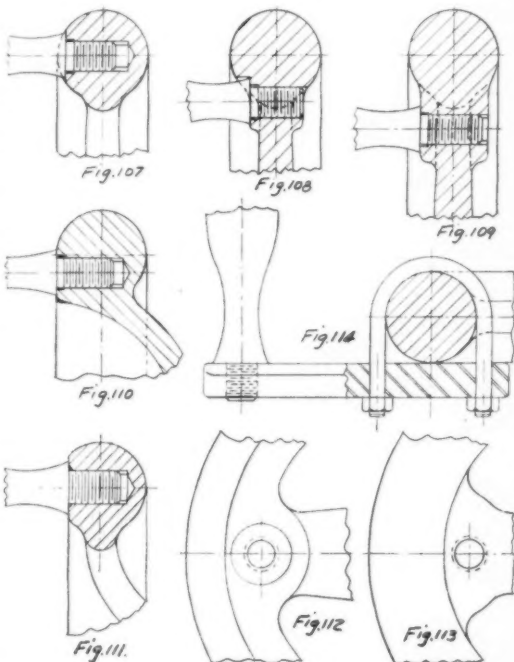
Fig. 103 is a lightweight, made of a thin piece of steel sheet, spun over, disk-shape. A flanged hub is spot welded at the center and a small slug is welded in to support the stud that supports the knob near the rim. This wheel is mounted nearly flush with the machine wall.

When weight is unimportant, Fig. 104 shows a cast iron hand-wheel, large in diameter but made with small

sections. The larger rim, spokes and hub are conventionally shaped. Another rim, larger than the other is slightly offset by six spokes. Enough finger room must be provided between the two rims.

In Fig. 105 there are six tapered handles protruding outward and radially from the six spokes. Although the flash is ground off, the handle remains comparatively rough preventing hand slippage. The six handles are reinforced by ribs at either side. Close-grained iron was used. The entire wheel except the hub is left as cast except for cleaning off the rough spots. It was thereafter painted.

Fig. 106 is a steel casting, left rough and painted. Additional leverage is available by inserting a steel rod into one of the six sockets, which are built



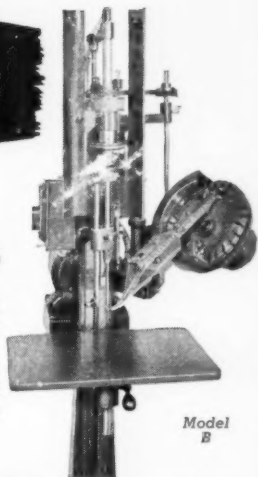
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at the end of the spokes by flaring the spokes sufficiently for strength around the hole. The mouth of the hole is countersunk for easy admittance of the rod. Only one rod is necessary. The end of the rod is coarse knurled with a length to accommodate two hands. The section of the spoke is round as is the rim. The partial plan view shows the rod socket and rim.

Position of Operating Handle

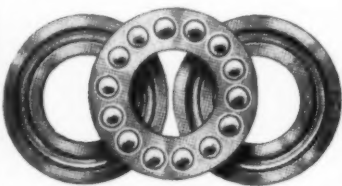
Handwheel operation is usually controlled with a handle or knob. For the present we are only concerned with handles attached parallel to the axis of the wheel. Knobs and handles will be discussed in a future article.

In the author's article, "Rotating Handles and Knobs", August, 1946 issue of the BLUE BOOK, can be seen numerous designs of free handles as used for handwheels. They include various types of grips, and are made of solid and drawn steel, plastic, wood, and hard and soft rubber.

When we think of the position of the

handle, we naturally think of the rim at its centerline or where the rim is largest in cross-sectional area, as in Fig 107. A handle of the solid type has been selected for all sketches in Figs. 107 to 114 inclusive as being the simplest to show. While a threaded shank is used, plain ends or the press-type are of course used extensively. In some installations, the handle is screwed or pressed against the curvature of the rim so that a gap results at the flat shoulder of the handle directly behind the shank. Ordinarily this does not look like a finished job. It is well to have a flat on the rim, the size of which is at least the same as the diameter of the shoulder. This can be accomplished in two ways. First a counterbore can be used or secondly it can be milled a flat. The former probably makes the best appearing joint. On a threaded shank the thread cannot be run clear up to the shoulder. Whether the thread runs out to a threading relief or otherwise, it is well to counterbore the threaded hole to a depth of

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about two threads or pitches, Fig. 107. Ordinarily the tapped hole should not run through the rim. It looks better and no sharp edges are left by a through-hole. The drill point should not even penetrate the finished surface. Tapping a blind hole is always a nuisance, but for appearance sake on a handwheel it is best.

Handwheels are seen with the handle off center of the rim in varying distances, Figs. 108 and 109. In the former, the centerline of the handle is off center of the rim an amount equal to the radius of the rim section, with a partial boss on the spoke blending into the rim and faced off with a counterboring operation. A small section of the rim is also counterbored at the same setting. The handle seats firmly against the boss. The tapped hole runs through the boss on the other side of the spoke. This boss is necessary for the drill to break through evenly. The thickness of metal through both bosses is equal to the length of the handle's threaded shank which fills the through-hole.

In Fig. 109, the handle is placed further in towards the center of the handwheel. It is feared when the rim of the wheel is drilled and reamed or tapped for a handle, the cross-sectional area of the rim is reduced to such an extent that it is weakened and might break when under load. With the proportions shown in the various figures, especially in Fig. 107 there is little likelihood of such a mishap. It should be remembered that as the area of the rim is reduced, it can be supposed that the outside diameter of the handwheel becomes proportionately smaller. Therefore, a smaller handle with a smaller diameter shank, whether plain or threaded, is used. Fig. 108 takes care of those cases where strength must be considered. In Fig. 109, however, nothing seems to be gained by placing the handle farther away from the rim center. The bosses are quite heavy, even thicker through than the length of the handle shank. The latter does not fill the hole but in this instance it was not too necessary as the handwheel was close to the wall of the ma-

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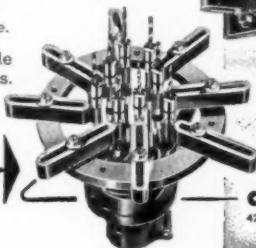
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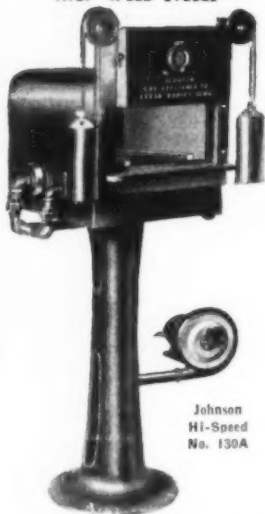
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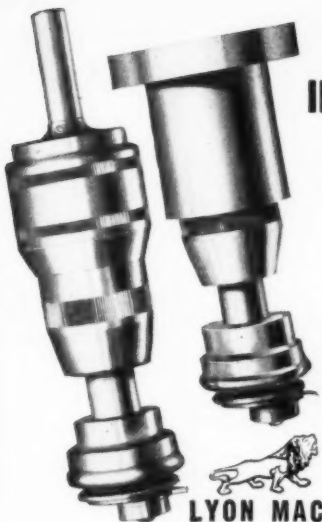
chine and could not be readily seen. One handwheel was observed in which the handle was placed on a spoke over 1/3 of the distance from the axis to the rim, in from the rim. This was a large wheel used for short stroke hand operation. Because of the large ratio between the radius of the handwheel rim to the radius of the pinion on the end of the wheel hub, very smooth operation was available by the use of a large wheel. The handle, if placed in the rim would mean a large cranking radius and tiresome to the arm.

There are several ways of having a square and finished joint at the handle shank shoulder without milling a flat or counterboring for a seat, Figs. 110 and 111. The wheel in Fig. 110 is a disked or bowltype of handwheel. The handle is placed off rim-center just enough to present a 100 percent seat for the handle shoulder. The front face of the handwheel is finished.

In Fig. 111 the rim of the handwheel is flattened at the front for its entire circumference which is turned on when the rest of the rim is form-ground. This also makes it unnecessary to mill or counterbore. The hole in this handwheel is countersunk instead of being counterbored. Handwheels having square or rectangularly shaped rim sections are naturally ready for the shank of the handle without further operations.

Two methods of spoke treatment are shown in front views in Figs. 112 and 113 where handles are to be attached. In the first the handle is off center approximately as shown in Fig. 108. The boss is flared out wide to blend into the spoke and rim outlines. The rim in this design is finished only half way around, namely 180° so that the diameter of counterbore bites into the relieved part of the rim partially and just deep enough into the boss to break through the surface scale of the cast iron. In Fig. 113, the hole is placed approximately as in Fig. 109. The spoke must be flared excessively or at least it was flared in this design.

Sometimes a handwheel cannot be made large enough to provide sufficient leverage without getting out of pro-

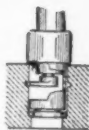


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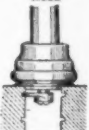
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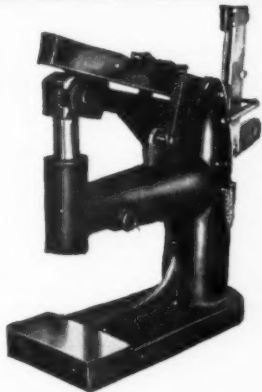


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portion to the mechanism it operates. A handle extension can be made that actually reduces the distance that the handle protrudes beyond the front of the wheel. In Fig. 114, an arm is made properly tapered and ribbed on either side. Four holes are drilled to accommodate the two U-bolts as shown. These bolts hug the rim for 180° with a good fit and are tightened with four hex nuts using lock washers if necessary.

Handles parallel to the axis of the handwheel are sometimes used in multiplicity. Two handles have been used not only to obtain balance but to facilitate very accurate setting of a graduated collar on the handwheel hub. With both hands on the handles, one propels, the other retards, therefore more accurate settings can be obtained, it is said. Once in a while a small handwheel can be seen with two handles parallel with the axis. One hand usually encompasses both handles and is in effect a positive grip affair.

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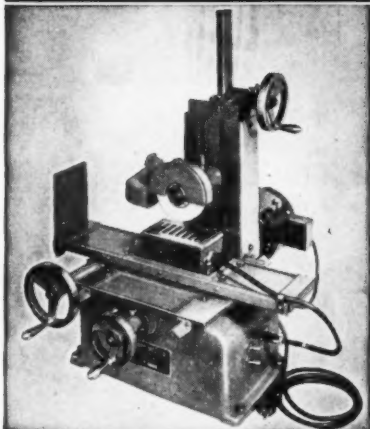
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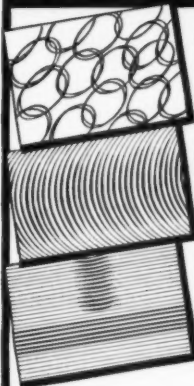
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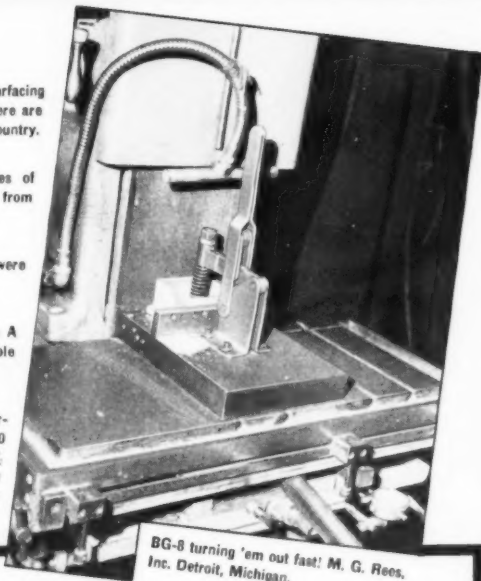
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Reports on seven case studies based on typical installations in seven diversified industries. Presents original method and belt-backstand method, name of part, material operations. 12 pages. **Behr-Manning, Dept. BB, Troy, N. Y.**

CARBIDE TOOL GRINDER

Illustrates and describes complete line of wet and dry carbide tool grinders, chip breaker tool grinders and diamond finishing tool grinders. Contains all their new and improved carbide tool grinders and gives specifications for each machine. **Hammond Machinery Builders, Inc., Dept. GP-16, Kalamazoo 54, Mich.**

MEEHANITE

"Formulas for Computing Maximum Stresses and Deflection in Circular Flat Plates." Tables, charts and formulas evolved and simplified for direct application to constructions utilizing the characteristics of Meehanite castings. **Meehanite Metal Corp., Dept. BB, Pershing Square Bldg., New Rochelle, N. Y.**

ELECTRICAL EQUIPMENT

Pictures and brief descriptions of the 21 MGC products. Includes buffers and grinders, motor generator, charger, motor generator sets, etc. 4 pages. **Motor Generator Corp., Box DM-785, Troy, Ohio.**

ROTARY SURFACE GRINDERS

Photographs and descriptions of various parts—wheel slide, work slide, wheel dresser, hydraulic equipment, work table and drive, generator, motor drives and extras. Specifications. 6 pages. **Arter Grinding Machine Co.**, Dept. BB, Worcester, Mass.

DOUBLE SPINDLE MILLING MACHINES

Typical operations, specifications, indexed photograph of machine. Describes drive, table feed and positive stop with dwell. 4 pages. **Kent-Owens Machine Co.**, Dept. BB, Toledo, Ohio.

MICRO PRECISION TOOLS

Covers vises and vise attachments, universal drill jig, universal adjustable angle plate, and universal dividing collet head, and prices of each. Includes collet head applications. 8 pages. **Matco Tool Co.**, Dept. BB, 2830-36 W. Lake St., Chicago 12, Ill.

SURFACE GRINDERS

Illustrates and describes several sizes Hydraulic Feed Surface Grinders. Includes constructional features and specifications. Features and machine illustrated. Pictures of machines in use in various plants. 26 pages. **Gallmeyer & Livingston Co.**, Dept. BB, Grand Rapids 4, Mich.

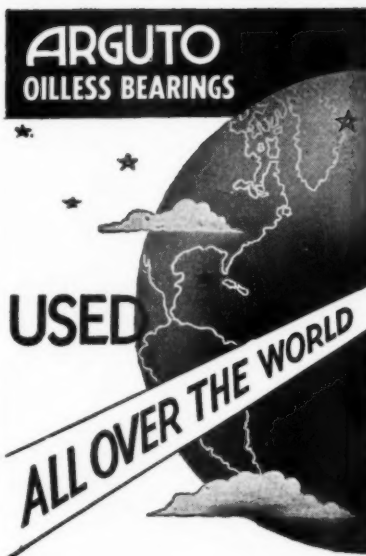
CUTTERS AND DRILLS

Covers specifications, dimensions, pictures and diagrams of Gear Tooth Rounding, Gear Tooth Chamfering, Gear Thinning, and Clutch Tooth Milling Cutters; Center Drills, and Form Relieved Cutters. Ordering instructions. 12 pages. **Gay-Lee Co.**, Dept. BB, 117 E. Hazelhurst, Ferndale 20, Mich.

TOOL AND HIGH SPEED STEELS

Covers high speed, shock resisting, die, and carbon tool steels, as well as discussion of tool bits, drill rod, and carmet carbide metal. Shows the city where stock is available according to type and size. 72 pages. **Allegheny Ludlum Steel Corp.**, Dept. BB, Pittsburgh 22, Penna.

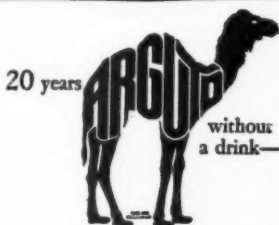
ARGUTO
OILLESS BEARINGS



USED
ALL OVER THE WORLD

... IN MANY DIFFERENT
APPLICATIONS

**"OUTWEARS THE BEST
BRONZE METAL"**



ARGUTO **OILLESS BEARING CO.**

WAYNE FUNCTION PHILADELPHIA



Printed attractively in two colors this Victor chart tells at a glance exactly which hand, band, or power blade to use on *any* material. It gives money-saving, work-speeding suggestions on the proper use and care of blades.

Write on your letterhead today for your free Victor wall chart and hang it near the tool crib or in your machine shop for ready reference. It's absolutely free.

Turn to your Victor supplier, too, for better-cutting, longer-lasting blades. He has a Victor blade for every job a hack saw or band saw can do—one that you can rely on to give you fast, clean cuts on metals, plastics and other non-metallics.



SAW WORKS, INC.
MIDDLETOWN, N. Y., U. S. A.

Makers of Hand and Power Steel Saw Blades, Drills and Band Saw Blades

WELDING ELECTRODE

Qualities of and uses for Amsco Toolface and technical data on welding procedures and heat treating. Charts, tables and complete descriptions cover heat treating processes, such as forging, annealing, tempering, etc. 4 pages. **American Brake Shoe Co., American Manganese Steel Div., Dept. BB, Chicago Heights, Ill.**

GEAR CHUCKS

One folder describes draw bar-operated bevel gear chucks and another pitch line control gear chucks. Typical applications, features and illustrations. Each folder 4 pages. **Garrison Machine Works, Inc., Dept. BB, 515 Bannock St., Dayton 4, Ohio.**

V-BELT DRIVES

Tables of stock drives give sheave combination, nominal driven speeds and horsepower per belt, and nominal center-distance using Transco V-belts. Also includes sheave dimensions and list prices. 16 pages. **Transmission Machinery Corp., Dept. BB, Dallas, Texas**

CENTERING MACHINE

Illustrations, description and specifications of single spindle and single head, single spindle and single head lever feed, and single spindle duplex centering machines. 4 pages. **The Whiton Machine Co., Dept. BB, New London, Conn.**

STEAM TURBINES

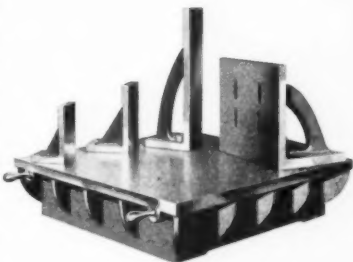
Illustrated and shows accessibility feature and discusses bearings, governors, throttling valve, rotor, etc. Dimensional data to facilitate selecting size and type of turbine for specific applications. 8 pages. **The Whiton Machine Co., Dept. BB, New London, Conn.**

HAND TOOLS

Illustrates and describes hammers, hand filing pieces and hand grinders. Explains features and shows pictures in use. 6 pages. **Speedo Mfg. Co., Inc., Dept. BB, 48 W. 48th St., New York 19, N. Y.**

"Milwaukee" Tested for Accuracy

Whether your measuring needs require surface plates, angles, or parallels, "Milwaukee" products provide the utmost accuracy at lowest cost. Surface plates range in size from 3 1/4" x 4" to 48" x 96". Angles, parallels, lapping plates, and straight edges are all made from the highest quality semi-steel and finished to exact specifications. A catalog is yours for the asking.



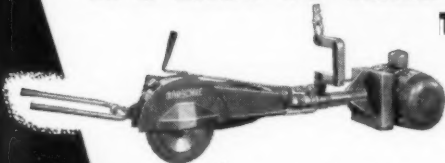
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165 SO. BARCLAY ST.

ENGINEERS AND MACHINISTS
SINCE 1907

MILWAUKEE 4, WISCONSIN

IT'S EASY TO TAKE THE GRINDER TO THE WORK



The Marschke Heavy Duty Swing Frame Grinder is easy to maneuver and gives maximum metal removal. Massively constructed for long, dependable service, this Marschke Grinder provides smooth true wheel rotation for steady contact between the wheel

and the work . . . gives minimum wheel wear. Provision is also made for adjustment of wheel surface speed to compensate for wheel wear.

Simplicity of construction, plus balance and maneuverability, contribute to efficient operation. These Marschke Grinders quickly pay for themselves and give many years of trouble-free service.

Other Marschke Grinders available include pedestal and floor stand grinders and buffers and the "In-Between" Grinder.

Write today
for complete
details

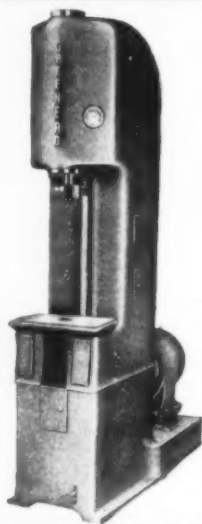
**VONNEGUT MOULDER
CORPORATION**

1805 MADISON AVENUE

INDIANAPOLIS, INDIANA

When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK

229



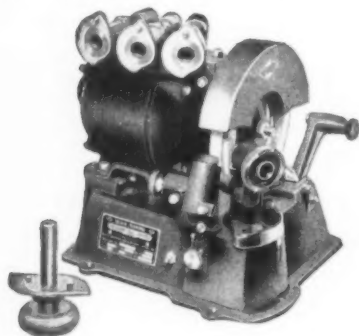
The New High Speed Hydraulic Press

For
Fast Assembly and
Broaching

Write For Bulletin 112G

GREENERD ARBOR PRESS CO.
Nashua, N. H.

—BLACK DIAMOND— • PRECISION GRINDER FOR SMALL DRILLS •



For sharpening small gauge or fractional drills—by hundreds or thousands—this moderately priced machine—motor driven—will keep any quantity sharp and ready for any job.

Anyone can operate a Black Diamond. Even the most inexperienced can keep all drills sharp and true centered, with smooth lips ground to exactly the same length—at the proper angle and with correct clearance for fast, precision drilling.

Black Diamond Grinders cut 50% and more on grinding as well as on drilling costs, sharpen without waste of expensive drill stock, reduce drill breakage and work spoilage to a minimum.

The built-in Diamond Dresser keeps the grinding wheel ever-sharp cutting and the Web Thinning Attachment cares for all types of Notched points to perfection.

MORE COMPLETE DETAILS ON REQUEST

BLACK DIAMOND SAW & MACHINE WORKS, INC.
45 NORTH AVENUE • • • NATICK, MASSACHUSETTS

Appointments and Promotions

James F. Lincoln, president of The Lincoln Electric Co., Cleveland, Ohio, announces the appointment of **G. E. Tenny** as service manager to direct the policies and operations of a newly expanded service department.

Robert Heller, nationally-known industrial engineer and head of Robert Heller & Associates, has been elected a director and member of the executive committee of Jack & Heintz Precision Industries, Inc., Cleveland 1, Ohio, Byron C. Foy, president, announced.

Election of **W. A. Roberts** and **W. C. Johnson**, executive vice presidents of Allis-Chalmers Mfg. Co. (Milwaukee, Wis.), and **Hugh Comer**, Alabama cotton manufacturer, to the firm's board of directors has been announced by Walter Geist, company president.

Stearns Magnetic Mfg. Co., Milwaukee, announces changes in personnel with the appointment of **Herbert L. Piasecki**, office manager, to the position of assistant treasurer. **A. B. Paape** has been made assistant secretary.

The Wheel Trueing Tool Company, Detroit, today announced the appointment of **Willard R. Gates**, Fennville, Mich., as their representative in the Western Michigan territory.

Richard H. Diesel has been appointed assistant general sales manager of the Stamford Division of The Yale & Towne Manufacturing Co. (N.Y. 17) it was announced by Meade Johnson, general sales manager.

J. N. Lind has been promoted to assistant general traffic manager of The National Supply Company, according to an announcement by C. R. Barton, vice president of the Company. He will make his headquarters in the Grant Building, Pittsburgh, Pa.

The Buffalo-Springfield Roller Co. of Springfield, Ohio, announces the appointment of **Murray D. Shaffer** as director of sales and research consultant for that company.



Murray D. Shaffer



Thomas C. Bradford

• • •

Thomas C. Bradford of Worcester, Mass., has been appointed to the position of field technical engineer by The Anderson Oil Company of Portland, Conn., makers of Lusol coolant and Rustavoid preservatives.

Paul S. Strecker has been named assistant to the president of the E. W. Bliss Company, 450 Amsterdam Ave., Detroit, manufacturers of presses, rolling mills and can machinery, Marshall M. Smith, president, announces. Mr. Strecker will continue to serve as personnel director of the company, with the additional responsibility of handling special administrative assignments. **J. J. Radigan**, personnel manager of the Bliss plant in Brooklyn, has been promoted to assistant director of personnel.

Mr. Smith also announced the appointment of **Jules Muller** as director of engineering. **Arthur Schloz** will continue as chief engineer of the Press Division and **H. Farrington** will continue as chief engineer of the Rolling Mill Division.

**SIMPLY TAP YOUR
PRESENT AIR LINE
AND INCREASE
PRODUCTION WITH
AIR-HYDRAULIC
PRESSES**

*No other press
does so many
jobs so well!*



2½ & 6 TON CAP.



ASSEMBLING—Laminations and rivets squeezed at one stroke. Steady controlled pressure prevents distortion.

CRIMPING—4 crimps made at one stroke with no damage to plastic base in assembly of radio tube.



ASSEMBLING—Worm pressed over knurled spindle on ventilation blind hardware.



BROACHING—8 slots broached at one stroke on plastic base. Broaching, slotting and piercing operations on plastics performed easily on A-H Press.



RIVETING—3 tubular rivets in ceramic base "squeezed with speed" at one stroke. Eliminates danger of damage to ceramic.



FORMING—Field coil squeezed into concave shape from flat. Only a squeeze assures perfect, uniform work, free of tape breakage.



STAKING—Multiple staking operation on metal and bakelite radio volume control.



Write for Catalog

EXCLUSIVE DEALERSHIPS AVAILABLE



AIR-HYDRAULICS, INC.

Factory: CHILSEA, MICHIGAN

Sales Office: 401-D Broadway, N. Y. 13

Harry H. Rose has been named general sales manager of the Simmons Fastener Corp., of Albany, N. Y., according to an announcement by Charles A. Simmons, president.



Harry H. Rose



C. W. Iams, Jr.

Floyd Rose, chairman of the board, announces the appointment of **C. W. Iams, Jr.** as assistant to the executive vice president of Firth-Sterling Steel and Carbide Corp., McKeesport, Pa.

The Du Pont Co., Wilmington, Del., has announced promotion of **Harry F. Brown** to general manager of its Explosives Department and **Samuel G. Baker** to general manager of its Electrochemicals Department. Both men were assistant general managers of the departments they now head.

Mr. Brown succeeds **William H. Ward** who was elected vice president of the company and Mr. Baker succeeds **F. S. MacGregor** whose retirement after a successful career of 31 years was also announced.

To lead its program of expansion, the Hanchett Mfg. Co. of Big Rapids, Mich., has brought **Alvin Haas** into the organization as vice president and general manager.

Appointment of **James C. Bjorkholm** to the position of Advertising Manager of the Foil Division, Reynolds Metals Co., 2500 So. Third St., Louisville, Ky., has been announced by company officials.

Expansion and streamlining of its marketing organization has been announced by Carboly Co., Inc., Detroit 32, Mich. Heading the marketing organization is **K. R. Beardslee** as vice president and marketing manager. All sales will be directed by **J. E. Welte**, sales manager, while all merchandising activities will be directed by **E. C. Howell**, merchandising manager.

Market research, budgeting, and sales order handling are under the direction of **G. M. Chandler**, business services manager. Training activities, including both educational programs for customers and sales organization training, will be directed by **J. M. Bertotti**, manager of training.



K. R. Beardslee

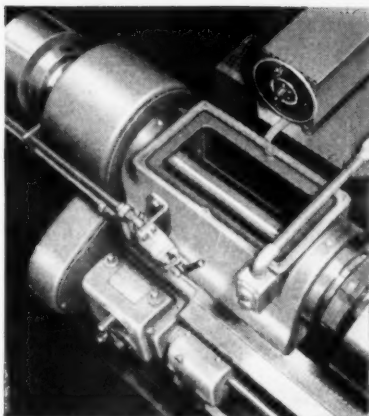


Marvin C. Barnum

The appointment of **Marvin C. Barnum** as their New York representative has been announced by **Dayton A. Rogers**, president of the **Dayton Rogers Manufacturing Co.**, 2824 13th Avenue South, Minneapolis 7, Minn.

The **Standard Tube Co.**, 24400 Plymouth Road, Detroit, manufacturers of electric welded steel tubing, announce the appointment of **Stanley L. Willis** as president and general manager, succeeding **T. F. Thornton**, retired.

C.W. "Ted" Grange has joined **Stewart-Warner Corp.**, Chicago, as director of public relations, it was announced by **Frank A. Hiter**, senior vice president.



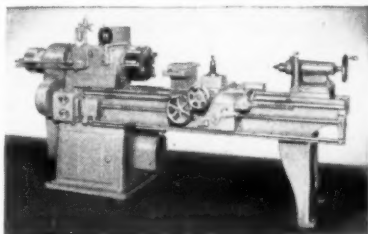
Belt driven headstock contains no gears

NEW MANUFACTURING LATHE PRODUCES AT 2600 RPM

A special purpose manufacturing lathe which operates at 2600 rpm was developed recently by the **R. K. LeBlond Machine Tool Co.**, Cincinnati 8, Ohio. The extremely high speed is achieved by means of a single-speed gearless headstock and a direct drive from the 10-hp motor to a special ball bearing mounted spindle.

Four speeds—2600, 1750, 1300, 875 rpm—are obtained through a drum switch.

LeBlond special purpose lathes like these represent the most efficient and economical solution to difficult metal turning problems. For information on your requirements, address sales engineering department, the **R. K. LeBlond Machine Tool Co.**, Cincinnati 8, Ohio.



(advertisement)

Randall L. Kamischke has recently been appointed New York State representative for the U.S. Broach Company, 6463 E. Seven Mile Road, Detroit 12, Michigan, according to an announcement by John Penny, president.



R. L. Kamischke



John E. Martin

• • •

New president of The Firestone Steel Products Co., Akron, Ohio, is **John E. Martin**, formerly vice president and director of American Type Founders.

C. C. Walker of Boston has been elected a commercial vice-president of the General Electric Company, (Schenectady 5, N. Y.) by the board of directors, effective January 1, 1948, it was announced today by Charles E. Wilson, G-E president. Mr Walker will assume responsibility for customer relations in the New England territory, with headquarters in Boston, and he will succeed T. S. Knight, General Electric commercial vice-president, who will retire December 31 after 44 years of service with the company.

ROSS OPERATING VALVE MOVES

Ross Operating Valve Co., Detroit, Mich., announces they have moved to 120 E. Golden Gate, Detroit. This will increase their manufacturing floor space approximately 30%. The board of directors also announced election of officers, with John Sainsbury, president and general manager; Russell Cameron, vice president and secretary; and L.M. Blomgren, treasurer. John E. Rowe has taken charge of valve production.

NIAGARA Aero Cooling Pays for Itself!

Saves Cooling Water, Increases Capacity, Saves Operating Costs

NIAGARA Aero HEAT EXCHANGER

Cools fluids to within 10° of atmospheric wet bulb temperature; holds to tolerances of 2° F.

Heat treaters increase production, improve quality, decrease rejections by controlling quenching bath temperatures with NIAGARA Aero Heat Exchanger.

Also used in liquid cooling in industrial and chemical processes, water jacket cooling, hydraulic fluid, transformer oil, lubricating and cutting oil cooling, vapor and steam condensing.

NIAGARA Aero AFTER-COOLER

Furnishes drier compressed air . . . eliminates half the moisture allowed by conventional after-cooling methods. Protects your air tools.

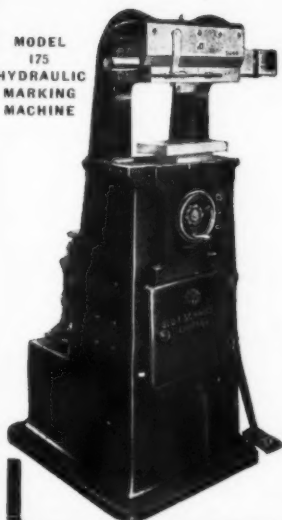
NIAGARA BLOWER COMPANY

Over 30 Years of Service in Industrial Air Engineering

Dept. MT-48 405 Lexington Ave., New York 17, N. Y.

Field Engineering Offices in Principal Cities

MODEL
175
HYDRAULIC
MARKING
MACHINE



MARK IT for MARKET

Modern Marking Machines now enable most manufacturers of metal components to identify their products at trifling costs. TRADE MARKS — MANUFACTURER — PART NUMBERS PERMANENTLY ROLLED ON YOUR PRODUCTS will help you market them.

Send prints of parts, showing required marking and its location on part with hourly production for free recommendation.

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GEO. T. SCHMIDT, INC.
1802 W. Belle Plaine Ave.
Chicago • 13 • Illinois



"The Outstanding Basic Improvement in FLEXIBLE SHAFT Machinery in 25 Years"

The NEW Strand Rotoflex 4-speed gear drive Flexible Shaft Machine (shown upper right) is another step forward in Strand quality precision tools for faster, easier, more economical production work. The Rotoflex 4-speed gear drive employs a patented, new type of quick change gear drive utilizing 4 positive speeds by a unique and easy method of instantly changing from one speed to another. Rotoflex machines are powered with totally enclosed ball-bearing motors having speeds from 850 to 9000 R.P.M., depending on motor.

Standard type Strand machines, (lower right) give portable rotary power at constant speeds with dependable results in all grinding, buffing, drilling, wire brushing and rotary filing operations. Hundreds of types and models from 1/4 to 3 H.P. available with suitable attachments for your specific requirements.

*Distributors in all principal cities
Ask for Bulletin No. 43 and Catalog No. 30*



N. A. STRAND & CO.
3016 NO. WOLCOTT AVE.
CHICAGO 40, ILL.

GSY-5



M-5



MODEL No. 16 "SPECIAL"

CONSTRUCTED AS PER SPECIFICATIONS OF U. S.
NAVAL AIRCRAFT FACTORIES

BUTTERFLY FILING and SAWING MACHINE

(Die Making Machine)

This is a very heavy, powerful machine and is designed for extra heavy filing and sawing, but it performs small work just as well. This type of machine is usually adopted in Ammunition Plants, Airplane Factories and machine shops where heavy and precision filing and sawing is desired. We also manufacture smaller models—Model D—10" Table; Model E.L.—12" Table, Model No. 14—14" table and heavy pedestals for all our machines.

HARVEY MFG. CORP.

161 GRAND ST., NEW YORK

Phone CAnal 6-5170



**BEWARE OF
IMITATIONS**

Our machine
carries the
Butterfly
trade mark.

Registered U. S. Patent Office

ANTON PARALLELS

INCREASE PRODUCTION

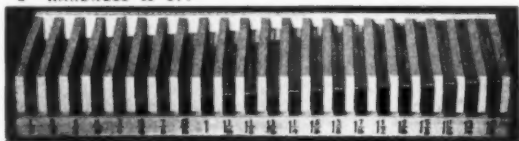
ANTON PARALLELS FILL A LONG-FELT NEED — permanently straight and accurate, yet priced for every-day general machine shop use.

ALL PARALLELS FULLY GUARANTEED — To be within the Limits Specified.

MAXIMUM SIZE TOLERANCE .001 INCH ON GROUND SIDES — Maximum Variation in Parallelism and Straightness within Length, .0001.

ROCKWELL "C" HARDNESS 65 UP.

IMPROVE QUALITY



ANTON PARALLELS COME IN 79 STANDARD SIZES

- $\frac{1}{4}$ " Thick x 6" Long — $\frac{1}{2}$ " to $1\frac{1}{2}$ " High in Steps of $\frac{1}{8}$ ".....\$96.00 per set — 22 pairs.
- $\frac{1}{2}$ " Thick x 6" Long — $\frac{1}{2}$ " to $1\frac{1}{2}$ " High in Steps of $\frac{1}{8}$ ".....\$71.00 per set — 11 pairs.
- $\frac{3}{4}$ " Thick x 6" Long — $\frac{1}{2}$ " to $1\frac{1}{2}$ " High in Steps of $\frac{1}{8}$ ".....\$98.75 per set — 11 pairs.

* Price per set includes a large Wooden Container

Large Stock of Single Pairs also Available

All Prices are F.O.B. New York

ANTON MACHINE WORKS

52 SANDS STREET

EASTERN TOOL & MACHINE CO.
170 BROADWAY, NEW YORK 7, N. Y.
National Representatives
Except Illinois, Iowa, Wisconsin
Indiana and Michigan

BROOKLYN 1, N. Y.

TOOLS KILL CO.
55 E. WASHINGTON ST., CHICAGO 2, ILL.
Representatives for
Illinois, Iowa, Wisconsin
Indiana and Michigan

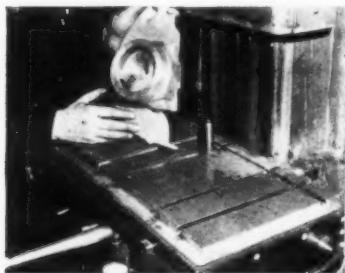
Shop Hints

43 PIECES PER HOUR INCREASED TO 167 WITH NEW MACHINING METHOD

The Porter-Cable Machine Company solved a machining problem by the interesting application of the wet belt machining method. With the new method 167 pieces per hour were produced as against 43 pieces per hour by a previous method; for every dollar spent on labor on the old method, only 30¢ was spent with the new.

The problem was to machine a 1½ inch surface on a cast aluminum gear housing removing 1/16 to 1/8 inch of stock. By the previous method only 43 pieces were produced per hour resulting in extremely high production

• • •



The belt is moving and the operator is about to place a casting on the fixture for machining. The edge to be machined is the vertical side of the housing (right side of the casting). The pin which is the only fixture required to hold the work in place is shown.

costs for this job. Loading and unloading time accounted for considerable unproductive labor costs. The jig consisted of a cradle to hold the gear housings, a stop to assure rigidity and a holding bar. Set up time for this fixture: 1 hour. The initial cost of making the fixture was excessive.

It was decided to place the job on a wet belt machine in the hope of reducing loading and unloading time and increasing production with a corresponding reduction in manufacturing costs.

A fixture was designed which consisted of a simple pin which fits into the bearing hole of the gear housing. This is the only work holding device necessary to hold the work against the moving belt. Set-up time of this jig: 10 minutes. Loading and unloading time was slashed.

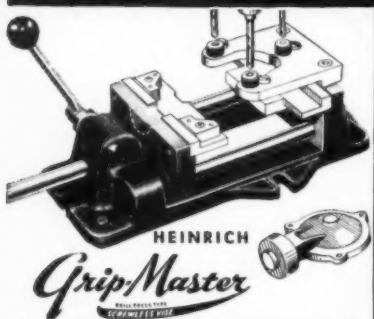
After placing the gear housing on the pin it is pushed against the abrasive belt and the required amount of stock is removed in a few seconds to close tolerance. Production per hour: 167 pieces.

The model used was a BG-8 wet belt machine manufactured by the Porter-Cable Machine Company, Syracuse 8, New York.

LUKENS REMOVE METALLIC OXIDE SCALE BY SODIUM HYDRIDE BATH

Installation of a sodium hydride descaling plant has been announced by Lukens Steel Company, Coatesville, Pa. The equipment, installed at a cost of approximately \$750,000.00 can be used

2 TIME SAVERS

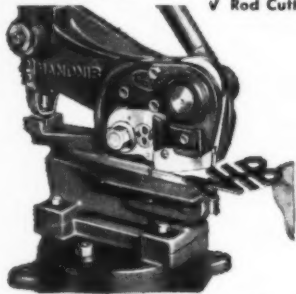


The World's Fastest Drill Press Vise May Also Be Used as a Base Structure for Jigs & Fixtures.

This unique screwless vise provides instantaneous, effortless setting. Patented gripping mechanism guarantees positive locking. Wide clearance between guide bars permits clear-through drilling. Built-in parallels save leveling time. Write for folder.

USE HEINRICH HANDNIB No. 5 for

- ✓ Outside Nibbling
- ✓ Inside Nibbling
- ✓ Shearing
- ✓ Punching
- ✓ Rod Cutting



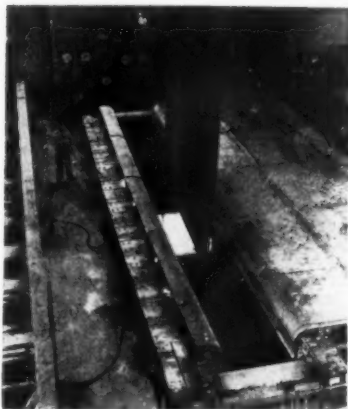
A five-in-one "handyman" which nibbles (outside and inside), shears, punches and cuts rods. Eliminates hours of tedious hand-work. Quickly, easily cuts templates and trial blanks in any desired shape. Takes up to $\frac{1}{2}$ " flat stock. Also $\frac{3}{8}$ " round stock. Write today for illustrated folder.

NATIONAL MACHINE TOOL COMPANY

DEPT. 108-D • RACINE, WISCONSIN

on all Lukens Clad Steels, alloy steels and on all metals which are not affected by molten caustic or by heating at 700°F., for the removal of metallic oxide scale, and for imparting an attractive pearly gray matte finish to plate surfaces.

Metallic oxide scale is removed by first immersing the work in the sodium hydride bath and then immersing it, while hot, in a water quench tank. The



A large plate of Lukens Clad Steel is being lowered into the sodium hydride bath. The clad steel plate has been preheated in the furnace to left. In the six burner pots to left of bath, excess hydrogen is burned off to show that it is being fed properly to maintain the proper solution in the sodium hydride bath.

scale, loosened by the sodium hydride bath, is carried off the work by steam which is created when the heated work is immersed in the water quench. The reaction stops when the reducing action on the scale is finished; overtreatment has no effect on the underlying metal.

The sodium hydride bath may be likened to an alkaline pickling bath which requires no electric current. In the course of removing scale, which is

accomplished without contaminating the bath, caustic soda results from the reaction of sodium hydride and metallic oxide.

Lukens' new facilities for sodium hydride descaling include a large preheating furnace where the work is brought to a temperature of 700°F. This preheating is necessary to prevent cold work from lowering the temperature of the sodium hydride bath to less than its constantly maintained 700°F.

From the furnace, the work is lowered into the sodium hydride bath which is produced by the reaction of sodium and hydrogen. Theoretically, each pound of sodium requires 7.8 cubic feet of hydrogen which is obtained from ammonia gas in a dissociator from which nitrogen passes off as an inert gas. As the hydrogen feeds into mixing boxes in the sodium hydride tank, excess hydrogen is burned off continuously to show that it is being fed properly to maintain the correct solution in the tank.

The work remains in the sodium hydride solution from 8 to 20 minutes. Then it is quenched in the adjacent water tank, where the steam which is generated helps remove the loosened scale from the surface.

As a preliminary to pickling, the work is immersed in a sulfuric acid bath to neutralize any remaining caustic and is then brightened by dipping in a nitric-hydrofluoric acid bath. Following these pickling operations, the work is subjected to a holding bath in water, then to a high pressure spray to remove all acid. The final bath is a hot water rinse, resulting in a clean, bright surface.

Appointment of **Robert H. McGrath** as assistant to the general manager of the National Machine Tool Builders' Assoc., 10525 Carnegie Ave., Cleveland 6, Ohio, was announced by Tell Berna, general manager of the Association.

CUT ANY SHAPE BETTER with BEVERLY Throatless SHEARS



The No. B-3 BEVERLY Bench Type Shear with Ball Bearing Hold Down handles 3/16" or No. 10 gauge stainless steel. This sturdy shear weighs 58 lbs. and is equipped with H. C. H. Blades for heavy duty service.

Let us send Bulletins giving full details on the BEVERLY LINE—

THE BEVERLY SHEAR MFG. CO., 3005 W 110th Pl., Chicago 43, Ill.

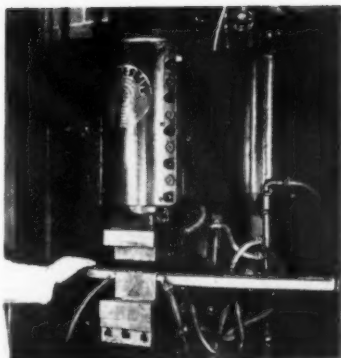
WELD ENGINEERING CUTS 33 OPERATIONS TO 5

The bus body pillar is an excellent example of how a simple design and process change can sometimes produce important savings in production costs, while increasing output and improving quality.

The reinforced pillar, fabricated from 13 separate stampings by Hawthorne Metal Products Co., Detroit, was designed originally for single spot welding. This in itself resulted in a rather low fabricating cost. When the job was released for production, however, the supplier of the welding equipment — Progressive Welder Company of Detroit—recommended the forming of a series of projections in five of the stampings — at the same time that these were produced.

The new stampings were then attached to the pillars by projection welding, using a press type welder. As a result, only one "weld" was required to join each of these five stampings to the pillar proper — instead of 33 individual spot welds.

Moreover, by using simple locating dies in the press welder it was possible to get accurate locating and alignment without clamping of the parts prior to



welding.

The net result of the changes was to double the productivity of the welding equipment—100 completed assemblies being produced per hour in comparison to 50 per hour by straight spot welding. Obviously this also cut the fabricating cost in half.

KEYWAYS

—SMALL QUANTITIES

The

—PRECISION ACCURACY

GLENNY

—on an ARBOR PRESS

—With THE TIME

Adjustable
Expansion

**PUSH
BROACH**

PAT.

Complete Assembly of Sturdy
Broach and Holder

No Additional Parts to
Assemble or Lose

Does Not Mar Bore

Factories, Shops,
Tool Rooms, etc.,
everywhere frequently save the
cost of a Glenny
in one day's use.

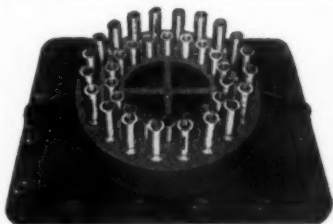
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Dealers Also Write

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10

**The EAST SHORE
MACHINE PRODUCTS CO.**

835 EAST 140th ST., CLEVELAND 10, OHIO



Pictured: a 38-Spindle Heavy-Duty
Drill Head.

**DESIGNERS AND
MANUFACTURERS OF
MULTIPLE DRILLING EQUIPMENT**

We invite your inquiry.

MICHIGAN DRILL HEAD CO.

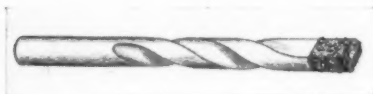
971 E. 8 MILE ROAD

HAZEL PARK, MICH.

STEELSET TWIST DRILLS FINISH HOLES TO CLOSE TOLERANCES

A new design in Twist Drills has recently been introduced by the Fish-Schurman Corp. The diameters range from 1/16" to 1/4 in 1/64" steps; they are also available in millimeter or half-millimeter graduations. The accuracy of their tolerance is plus .005, minus .000; the lengths are from 1" to 3"; shorter drills for smaller diameters are available.

These "Steelset" Drills have longer life, due to the special bonding process. They are designed with a large central diamond at the tip for rapid penetration (see illustration). The impregnated



section is designed flat-shaped to accelerate grinding. The flutes, plus the flattened shape of the impregnated

diamond section, permit chip clearance and coolant entry.

The applications of these tools include drilling small diameter holes in a wide range of sizes; drilling non-cored dead-end holes; drilling deep holes, and holes to closer tolerances. They are also useful as reamers. A complete list of specifications and uses of the new "Steelset" Twist Drills is available upon request to:

Fish-Schurman Corp., Dept. BB
230 East 45th St.
New York 17, N. Y.

DU MONT MAGNETIC BASE FOR DIAL INDICATORS

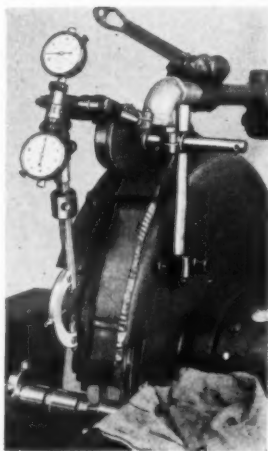
The Du Mont "Minute Man" Magnetic Base consists of an Alnico permanent magnet base having a 40 to 50 lb. grip on all four sides. Interchangeable brass shafts, 7/32" dia. and 5/16" dia. are provided for attachment of a dial indicator or height gage. The Base is

VISUAL GRINDING SIZE CONTROL

Well known. Visual reading. Grinding size and quality control on cylindrical grinders. Completely adjustable for all grinders. Thousands in daily use in U.S.A. Many in foreign countries.

Diameter, diameter and length, splines, worms. Over 400 special designs for your problems.

FOSTER ENGINEERING COMPANY
4200 WOODWARD AVENUE
ROYAL OAK, MICHIGAN



also available equipped complete with a Federal Dial Gage graduated in thousandths, packed in a hardwood case.

The "Minute Man" Magnetic Base permits instant application of the gage at the most convenient spot on lathe work, millers, surface or cylindrical grinders, shapers, etc. No clamps or fixtures are needed; the gage is accurately and firmly positioned even in places otherwise inaccessible.

If demagnetized by abuse or contact with a demagnetizer, the unit will be restored to full strength by the manufacturer. In addition to saving time and increasing the utility of dial gage applications, this Magnetic Base holds work in position on surface plates for layout; it supplies magnetic power to rods for chip removal from drilled or tapped holes. The shaft socket holes are tapped with standard 12-24 threads to accommodate special length shafts. Plating departments, for example, attach long handles, and use the magnet to retrieve steel parts from tanks. Complete



information may be obtained from:

**The Du Mont Corp., Dept BB
Greenfield, Mass.**

YOUR MARKING IS EASY

**IF YOU USE
PROPERLY
DESIGNED AND
ENGRAVED STAMPS**

**TRY—
"THE ORIGINAL MARK-
ING SPECIALISTS"**

MAKERS OF—

MARKING & NUMBERING
MACHINES, STAMPS, DIES,
TYPE, NAME PLATES, NAME
PLATE STAMPING MACHINES,
METAL SIGNS, ENGRAVING,
BRANDING IRONS AND EQUIPMENT
FOR METAL & PLASTICS
MARKING.

The
ACROMARK
Company

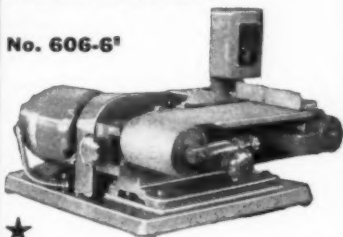
15 MORRELL ST., ELIZABETH 4, N. J.



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No. 606-6*



This BELT SURFACER is accurately balanced and sturdily built for hard constant use. It is smooth running and adjustments are quick and convenient. Abrasive belt is 6x42" handling a wide range of work speedily and accurately. Let us send bulletin giving full details, covering our complete line of bench and floor type surfacers, 6" to 20" sizes.

Let us send bulletin giving full details.

PRODUCTION MACHINE CO.
GREENFIELD, MASS.

New STEEL INSPECTOR'S STAMPS



Faster
Identification
of Inspectors or Operators.
Different borders may be used
for different shifts. Available
in 4 sizes. Write for prices
today.

NEW METHOD STEEL STAMPS, Inc.
167 JOI CAMPAU DETROIT 7, U. S. A.

**PRICE TAGS
of QUALITY**

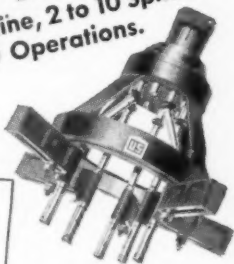
PRICES

U-1	3 Spindle Head	\$150.00
4	" "	155.00
5	" "	160.00
6	" "	170.00
8	" "	180.00
8	" "	200.00

Adjustable

MULTIPLE DRILL HEADS
Fit any machine, 2 to 10 Spindles.
Save 2 to 10 Operations.

6" DRILLING AREA
1/4 capacity
21, 32 center



IMMEDIATE DELIVERY!
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For descriptive catalog.

PRICES

U-2	3 Spindle Head	\$177.00
4	" "	204.00
5	" "	231.00
6	" "	258.00
7	" "	285.00
8	" "	312.00
9	" "	339.00
10	" "	366.00

10" DRILLING AREA
1/2 capacity in cast iron standard
3/4 special adaption in cast iron



SINCE 1915

Also manufacturers of all types of fixed center heads

UNITED STATES DRILL HEAD CO.

CINCINNATI 4, OHIO

News of the industry.....

BRYANT ASKS THAT MARSHALL PLAN INCLUDE PROVISION FOR PURCHASE OF MACHINE TOOLS

European recovery under the Marshall Plan will be to a large extent paced by the ability of the devastated countries to obtain the modern machine tools which American ingenuity has produced since the war, stated A. G. Bryant, president of the National Machine Tool Builders' Association, 10525 Carnegie Ave., Cleveland 6, before the Committee on Foreign Affairs of the House of Representatives.

"Machine tools," Bryant said, "are basic to all production—food, as well as manufactured articles—and before any of the nations can re-establish their economies, they must make a major investment in these basic tools."

"With machine tools, and only with machine tools, can Europe produce end products made of metal, or repair the equipment in their devastated railroad shops or factories. Machine tools are not only the basic machines of industry, but in their unique ability to reproduce themselves and repair other equipment, they constitute the 'seed' of industrial operations."

Bryant's testimony before the Foreign Relations Committee was motivated chiefly by the fact that, according to Mr. Bryant, although machine tools are absolutely essential to any European recovery program, no provision for the purchase of machine

.....
Alexander G. Bryant
pres., Nat'l. Machine
Tool Builders Assoc.
Testifies before Hse.
Foreign Affairs Com-
mittee for Machine
Tool Industry.
.....



tools for this purpose has thus far been made under the Marshall Plan.

Bryant recommended to the Committee a program whereby machine tool equipment could be purchased by industries in European rehabilitation areas, with United States help, to secure increased productivity which would enable such industries to take their proper place in the postwar economic picture upon a properly productive and competitive basis.

ANNOUNCE NEW NAME

Milwaukee Chaplet & Mfg. Co., 1033 S. 40th St., Milwaukee, Wis., has announced that its Machinery Manufacturing Division will be known as the Rice & Machine Co. but will continue to operate as a Division of the parent company.

NEW BUILDING HOUSES DETROIT BUCKEYE DISTRIBUTOR

The new, modern building of the Baker, Plancon and Gilmore Co. will house sales and service facilities of the Buckeye Tools Corp., Dayton, O., in the Detroit area, H. O. Gummere, vice president of the Dayton company announced. Manufacturers of portable electric and portable pneumatic tools, Buckeye Tools has been represented in Detroit by the Baker, Plancon and Gilmore company for many years.

In addition to being a distribution centre, the new headquarters will also handle repair and other services, Mr. Gummere said, adding, "The new building and location will enable the Buckeye Tools Corporation to more adequately handle the needs of its many customers in the industrial area surrounding Detroit. Construction of the new headquarters is in keeping with the desire of Buckeye Tools to keep abreast of the development of industry."

OBITUARY

Heller Brothers Company, file manufacturers of Newark, N. J., announce with deep regret the recent death of Paul Heller.

AMERICAN CYANAMID ACQUIRES S.T. DAHL CO. ON WEST COAST

The American Cyanamid Co., 30 Rockefeller Plaza, N. Y., has acquired S.T. Dahl Co., Los Angeles, Calif., along with its personnel.

Sheldon T. Dahl has been appointed west coast sales manager for the Industrial Chemicals and Plastics Divisions. An office and warehouse have been opened at 2472 E. 8th Street, Los Angeles 21, Calif.

Mr. Dahl's company has been sales agent for the Industrial Chemicals Division of American Cyanamid Company since 1925 and has represented the Plastics Division on the West Coast for the past several years.

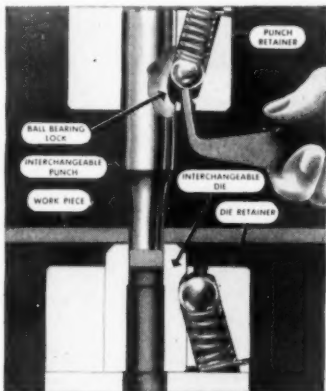


INTERCHANGEABLE PUNCHES and DIES

Quickly Inserted... Rigidly Held!

Allied's R-B Interchangeable Punches and Dies are quickly inserted—rigidly held for accurate, trouble-free punching in the metal-working and plastics industries. They are available from stock in standard round, oblong and square shapes of almost any required size. Specials of any size, shape or material are promptly furnished to your specifications . . . and delivery dates are dependable.

Large, illustrated R-B Catalog gives complete details, specifications. Write for it.



ALLIED PRODUCTS CORPORATION

Department 22 • 4544 Lawton Ave., • Detroit 8, Michigan

CLEVELAND TWIST DRILL DEDICATES FIVE PATENTS

The Cleveland Twist Drill Co., Cleveland, Ohio, as a gesture of good will to the metal-working industry, has dedicated to the public five of its patents covering tools embodying hard non-ferrous metal inserts such as may be formed of tungsten carbide.

This unique dedication covers the following patents: Re. 19,182, Drill and Like Instrument and Method of Making Same; 1,887,372, Cutting and Forming Tools; 1,887,373, Reamers and the Like; 1,887,374, Drill; 1,977,845, Cutting and Forming Tools, Implements and the Like, and Method of Making Same.

ARMSTRONG BROS. MOVE TO NEW OFFICES

New general offices and works of Armstrong Bros. Tool Co. are located in the Elston-Central Industrial District at 5200-5300 W. Armstrong Ave., Chicago 30, Ill. They have over 170,000 square feet of manufacturing space devoted to the further development of their well-known line of quality tools.

UNION MFG. GETS HANNIFIN CHUCK & CYLINDER BUSINESS

The Union Manufacturing Co., New Britain Conn., announces the acquisition of the Hannifin air chuck and air chuck cylinder business from the Hannifin Corp., Chicago.

Orders for complete units and parts are being accepted and will be delivered from the purchased inventory or scheduled for delivery upon completion of manufacture.

Control valves, regulators, filters, and required accessories as well as chucks and cylinders will be furnished.

BATH CO. APPOINTS DISTRIBUTOR

L. C. Pensinger & Son, 1609 Oak St., Kansas City, Mo., have been appointed as distributors by John Bath Co., Inc., Worcester, Mass., manufacturers of Bath Ground Thread Taps, plug thread gages, ring thread gages, super internal micrometers and master reference rings. They will specialize in custom built and regular "in stock" distribution of Bath Products in Kansas and Western Missouri.

PARTS DRAWN OF STAINLESS STEEL OR OTHER METAL PARTS PRODUCTION



HERE'S WHAT WE CAN DO FOR YOU.

We are equipped to produce at low cost, deep draws in stainless steel, aluminum, sheet steel, etc. It is routine production to hold wall thicknesses and tolerances to close limits. Therefore, it is possible for us to adhere to the most exact specifications. We are producing Stainless Steel pen and pencil caps for one of the leading Manufacturers and many other items for varied industries.

Write for further information

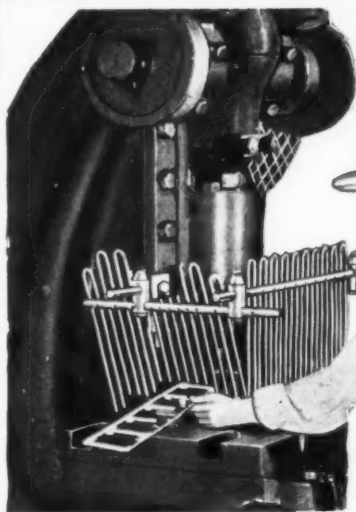
PARTS SHOWN ONE-HALF SIZE

KANKAKEE TOOL AND DIE WORKS, INC. **MFRS. OF METAL PARTS - DEEP DRAWING-STAMPING-FORMING**

367 SCHUYLER AVE.

DEPT. 2A

KANKAKEE, ILLINOIS



SAVE HANDS WITH STRANDS

**SAFEGUARDS
FOR PUNCH
PRESSES**

*Send for Enclosure
and
Sweep Safeguard
Circulars.*

STRAND MFG. CO., INC.

SAFETY ENGINEERS

607 W. Lake Street, Chicago 6, Illinois

SAVE TIME
on intricate, angular
SET-UPS

Multi-Swivel VICE

Fully universal . . .
three swivels simplify the
setting of compound angles.
Parts interchangeable . . . can
be used as a plain flanged vise,
a swivel vise or multi-swivel vise.

**Write for
name of
nearest distributor**

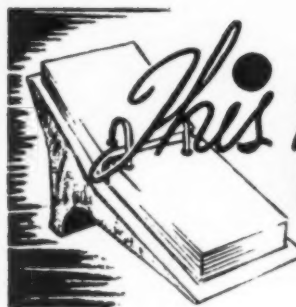


The Platen increases capacity of the
unit. Vise and Platen are interchangeable.



MASTER TOOL CO.

161 HIGH STREET • BOSTON, MASS.



This Month's **INDUSTRIAL FILMS**

IT'S YOUR MONEY

*The Yale & Towne Mfg. Co.
4530 Tacony St.
Philadelphia 24, Pa.*

*40 minutes. Black and white. Sound.
16 mm. Obtainable from Yale &
Towne.*

Machine tools, materials costs and wage rates are often the things considered important by manufacturers when considering cutting costs, but the question of materials handling is often times ignored or slighted. "It's Your Money" points out how 30% of the production dollar goes into the mere movement, lifting, storage, rehandling and shipping of materials—adding only to product-cost and not to product-value.

The film employs Lowell Thomas as narrator and he traces the growth of the industrial power truck in the past 35 years and explains different types of jobs properly done by today's self-loading platform trucks, high-lift trucks, fork trucks, tractor-trailer systems and crane trucks. He shows how the ingenuity of users makes possible extraordinary manipulations of electric trucks. For example, men are shown working in over-narrow aisles, dumping a bin 10 feet in the air; taking a 12-foot load through a 10-foot door and up-ending oil drums.



The materials handling systems of 20 leading plants are analyzed, among them being Muncie Malleable Iron, Cleveland Corrugated Box, Gisholt Machine, National Aluminate, Grays Ferry Brick, Kingan Packing, Square D, Food Fair Warehouse, Edison Hotpoint, International Business Machine, Chrysler, International Harvester, United Fruit, Youngstown Sheet and Tube, and Celotex.

The film is available for showing to business men's clubs, industry study groups, engineering society chapters, college and trade school classes, company foreman's gatherings and other groups interested in better production engineering.

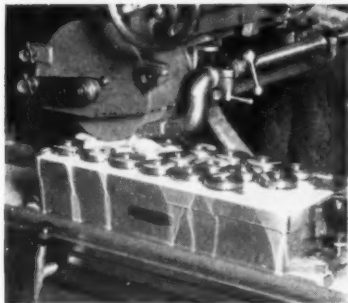
THE SURFACE GRINDER

Norton Company
Publicity Dept.
Worcester 6, Mass.

17 minutes. Kodachrome. Sound. 16 mm. Obtainable from the Norton Company.

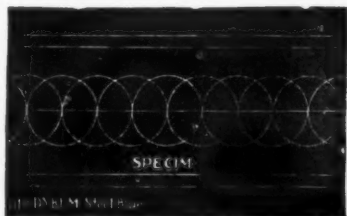
This is one of a series of training films known as "Lessons in Grinding." The films are available to industrial apprentice schools, foremen's groups, vocational schools, colleges and universities—wherever machine shop practice is being taught.

"The Surface Grinder" covers types of machines, classes of work, surface finishes and the what, why and how of operation. Several types of surface grinders employed for different classes of work are introduced; and featured, too, are the different types of surface finishes they produce.



The preparation, operation and care of the machine are described in detail. The what, why and how of the numerous push buttons and operating hand-wheels and levers that control the machine functions are demonstrated.

The demonstrator goes through every step required to obtain high production and good quality of work. Instruction in the mounting, truing and



DYKEM STEEL BLUE STOPS LOSSES making dies & templates

Simply brush on, right at the bench; ready for the layout in a few minutes. The dark blue background makes the scribed layout lines show up in sharp relief, and at the same time prevents metal glare. Increases efficiency and accuracy.

Write for full information.

THE DYKEM COMPANY

2301G North 11th St., St. Louis, Mo.
In Canada: 2466 Dundas St. West, Toronto, Ont.

OUR EFFICIENT TOOL DESIGNING

means
*better production
at a lower cost*

Efficient tool designing in post-war's competitive production is a "must". Our experience guarantees you tools—designed for economy of operation, resulting in your increased production at lower costs.

COLUMBUS DIE • TOOL
and Machine Co.
930 CLEVELAND AVE., COLUMBUS 10 OHIO

control of the grinding wheel for maximum cutting efficiency is an important part of the lesson.

The Norton Company request that showing dates be selected three to four weeks in advance if possible and one or two alternate dates be suggested. Films are shipped from Worcester express prepaid and should be returned express prepaid.

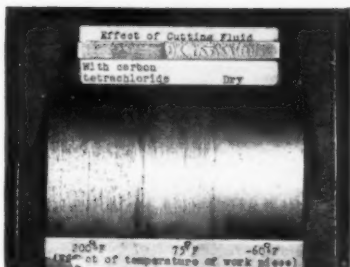
• • •

RESEARCHES IN HIGH SPEED MILLING

*The Cincinnati Milling Machine Co.
Cincinnati 9, Ohio*

*22 minutes. Black and white. Silent.
16 mm. Obtainable from The Cincinnati Milling Machine Co.*

Cincinnati's Research Department produced the film and herein present the story of high speed carbide milling. They begin with a simple exposition of the meaning of positive and negative rake in metal cutting tools, the



various angles involved, and the mechanism of chip formation itself. The "slow-motion" scenes are photographed at the rate of approximately 3000 pictures per second; thus when projected at about 16 pictures per second, each second of action is expanded to about 3 minutes and 20 seconds of observations.

A typewritten lecture is provided, which may be read to the audience during the film projection.

DORMAN

Tappers

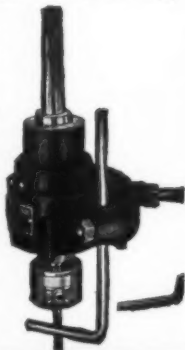
TAP HOLES
2-56 to 1 1/4"

Single adjustment changes from light friction to positive drive or intermediate, to prevent tap breakage. No. 1 tapper, friction or positive, drives 2-56 to 3/8" tap in steel or any other material.

No. 2-A positive tapper drives 3/8" to 1/2" tap in steel or any other material.

No. 3-A drives 1/2" to 1 1/4" in steel or any other material. External Threading, too with Round Split, Button or Acorn Dies. Write for Die Holder Bulletin.

Delivery from stock
Write for details.



Dorman Machine Tool Works

40 S. MAC QUESTEN PKWY.
MOUNT VERNON, NEW YORK

**The Very Best
Facilities for
Die Cut**

STAMPINGS

In short runs

Phone factory engineers in
principal cities

Or Write

MINNEAPOLIS 7, MINNESOTA

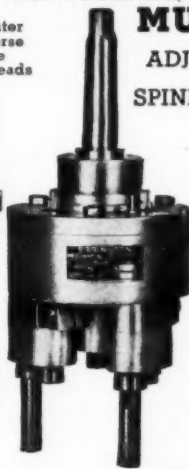
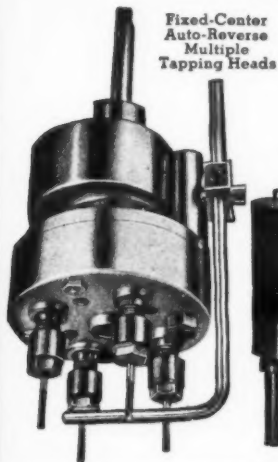
DAYTON ROGERS

Manufacturing Company

ERRINGTON MECHANICAL LABORATORY
STAPLETON, STATEN ISLAND 4, N. Y.
 6701 N. SIOUX AVE., CHICAGO

MULTIPLE HEADS

ADJUSTABLE MULTIPLE
 SPINDLE DRILLING HEAD



All Parts
 Fully
 Enclosed
 to Insure
 Pressure
 Lubrication
 and
 Rigid
 Support of
 Adjustable
 Spindles



DRILL JIG BUSHINGS



Accurate



Interchangeable



Concentric

Acme Industrial Company
 210 N. LAFLIN ST.
 CHICAGO 7, ILLINOIS

WRITE FOR FREE CATALOG!

NEW TECHNICAL BOOKS

MEASURING AND RATING EMPLOYEE VALUE

By John B. Probst, Consultant in Personnel Administration. Published by The Ronald Press Co., 15 E. 26th St., N. Y. 10, N. Y. 1947. 166 pages. \$5.00.

There are many employee rating plans on the market, some excellent, some possessing glaring weakness and of such little use as to be actually detrimental. The personal judgment plan is subject to the weakness or strength of the judge, but it has the advantage of being simple and costs relatively little in effort and money. "Judgment by factors," judging on several bases like quality of work, attendance, etc., presents a chance for more analytical judgment.

This book presents an attempt at an improved rating system, known as the Probst Service Report, which is a check-list method for evaluating employee performance. Mr. Probst points out that his system eliminates many of the faults of other systems currently or formerly in use. The proof is in the fact that different raters at different times have rated the same employees almost identically, and later check-ups under actual working conditions have verified the validity of earlier ratings.

The operation of the system is explained and forms illustrated. Occupations in public administration, the professions, skilled and unskilled labor,

inspection, sales, clerical work, and education are covered and the rating plan can be directly applied by those with persons working under their direction. Actual application of methods and checks of ratings in later actual practice are given.

This work is of particular importance in this day of emphasis on merit rating as a factor in management-labor relations.

WAGE RATES IN UNION AGREEMENTS

Prepared by The Bureau of National Affairs, 1231—24th St., N.W., Washington, D. C. 1948. 650 pages. \$10.00.

This volume brings together rates being paid in manufacturing and non-manufacturing industries throughout the country, as reflected in approximately 700 agreements selected from the Bureau's files. All wage scales cited were negotiated subsequent to January 1, 1947, but a few were scheduled for revision before February, 1948. The agreements used were selected to provide an overall picture of the present wage scene.

The report is set up in a concise and logical manner. Listings of wage rates from each contract are preceded by names of company and union, geographical area in which the company operates, size of community, date rates are effective, date when the rates are subject to revision and the amount of



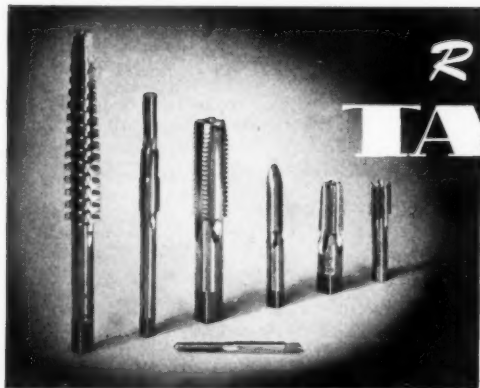
LINLEY

FOR NOISELESS, HIGH SPEED RIVETING

Rotary spinning principle shapes uniform heads, silently . . . capacities up to 3/8 inches diameters. Adjustable spindle stroke, controlled pressure . . . double row radial thrust bearing supports spindle, assures long life. Table elevating screw prevents slipping. Six floor or space-saving bench models . . . sturdily built for trouble-free operation under severe production schedules.

FOR COMPLETE INFORMATION,
WRITE FOR BULLETIN.

LINLEY BROTHERS CO., 663 STATE ST. EXTENSION
BRIDGEPORT 1, CONNECTICUT



R & N TAPS

For your production Tapping job Reiff & Nestor Taps ground from the solid 18-4-1 steel after hardening are unexcelled.

You get the benefit of correct design, material and construction, plus the background of 37 years' experience in fine tool making when you buy R & N Taps.

Our new No. 8 — 109 page Catalog now ready. A request on your letterhead brings it to you.

Next time try R & N Taps.

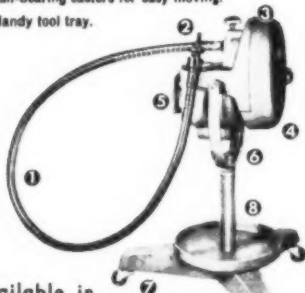
REIFF & NESTOR COMPANY

manufacturers of TAPS AND REAMERS
LYKENS, PA.

Up to the Minute APPEARANCE and CONSTRUCTION

See the **NEW STOW** **STREAMLINER** FLEXIBLE SHAFT MACHINE

1. Genuine STOW flexible shaft, 6 ft. long. Tough heat-treated core, $\frac{3}{16}$ " diameter. Durable, oil-resistant casing.
2. Ball-bearing handpiece, with detachable wheel arbor.
3. Quick change in speed ratio; selection of four shaft speeds.
4. Streamlined enclosed motor and drive for protection to user and machine—better appearance.
5. Ball-bearing, self-lubricated motor.
6. Free-swinging pivot mounting.
7. Ball-bearing casters for easy moving.
8. Handy tool tray.



Available in high or low pedestal, suspension, and bench mountings. Power and speed ratings for great range of applications. The most modern flexible shaft machine available—backed by Stow's 72-year quality and performance reputation. Write for full description now, or see this smooth working, smooth looking STOW at your supply house.

STOW

MANUFACTURING CO.
30 Shear St., Binghamton, N. Y.

bonus paid for shift or night work. For easy reference, lists to facilitate checking rates appear at the end of the volume by industry, union, area or size of community. An industry cross-reference list is also provided.

Primarily this report permits the checking of rates for specific jobs or comparable rates within the same industry. It may also serve as a guide to the general level of wages in any given industry, or the relationship between jobs in the same plant. Some jobs appear in more industries than others. For example, rates for clerical and maintenance employees do not appear in as many of the break-downs as other jobs like machinists or tool and die makers.

Information for some industries is limited because their contracts were being negotiated in late 1947 or early 1948 and rate information was not available. Such industries include clothing, fur, leather and shoes, railroads, and several of the service trades.

According to the publishers, "This special report is that first comprehensive attempt to provide negotiators with facts needed for today's wage bargaining. It is published in the belief that it will fill a long-felt need; that, given the facts on wage rates being paid in other companies, industries and areas, bargaining over wages in a particular plant or business will be made smoother."

A PRACTICAL THEORY OF MECHANISMS

By Paul Grodzinski. Published by Emmott & Co., Ltd., 31, King St. West, Manchester 3, England. 1947. 166 pages. 7/6 net (Approximately \$1.50).

According to Mr. Grodzinski, the main components of machines are the mechanisms around which the machines are built, and he divides them into eight classifications: screw, crank, gear, band and cam mechanisms, ratchet gear, fluid gear and electrical

mechanism. He maintains that to study mechanisms properly, isolation from other parts is necessary. Structural details, such as bearings, and forces, speeds, accelerations, etc., have been eliminated from this study. Naturally, these are important details, but they clutter up explanation and hinder understanding of basic elements. After the conception of the mechanism is clear, these other factors may be taken up and better understood in correct relations to each other and the mechanisms themselves.

Characteristics of each classification are taken up and tables and charts are liberally included. The first chapter deals with Chains of Links and Element Pairs: Kinds of movements, together with a table depicting general scheme of kind of movements and characteristics; chains of mechanisms—a special characteristic of all mechanisms and combined mechanisms of the most complicated form is that the single members are always connected like the members of chains; formation of these chains; pairs of elements—joints which perform the inter-connection; and form and shape of element pairs and members. Other chapters discuss The Screw Mechanism, The Four Bar Link and Derived Mechanisms, Cam Mechanisms, Gear Trains, Belt and Fluid Drives, and Ratchets.

The author intends that this volume make the reader more conscious of basic ideas involved and aid in understanding more advanced literature.

AUTOMATIC RADIAL GUARD

Lists advantages and construction features. Illustrates elasticity of use. Close-up pictures of construction features and application to tool. Folder. Flohr Safety Equipment, Inc., Dept. BB, Buffalo 17, N. Y.

IRON CEMENT

Describes advantages for stopping leaks in concrete, brick or stone walls and floors, as well as effective application and use. Leaflet. Smooth-On Mfg. Co., Dept. MT, 570 Communipaw Ave., Jersey City 4, N. J.

famco machines

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Famco arbor presses are available in 32 stock models for floor or bench mounting . . . feature exclusive adjustable gib for front and side ram adjustment. Average less than 2c a year per press for maintenance cost!

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Savings multiply on light punching and forming jobs with the use of any one of the 10 Famco foot press models. They may be bench or floor mounted.

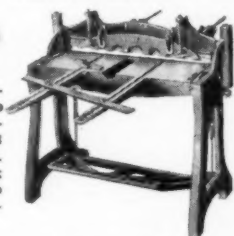


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Newest of the Famco family, these power operated, open-back, inclinable punch presses are available in bench or floor models. Have semi-steel cast iron frames; solid, forged, precision-ground crank-shafts. With or without motor.

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Famco foot-operated shears do precision shearing of up to 18 gauge mild steel. Come in 5 cutting widths (22" to 52") . . . have easy-to-set gauges.



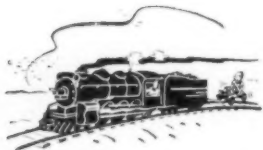
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You don't need a locomotive
to pull a child's wagon.

Costs are becoming more important, and a lot of extra cost is built-up when you turn small parts on large expensive lathes that could be machined easier, faster, and cheaper on a small moderate priced SHELDON T-S56 Precision Lathe. This difference in operating cost is a substantial factor in ultimate profit, especially when with the same tool investment and the same power cost it is possible to have more lathes and multiplied output.

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Write for Catalog describing the T-S56 and other
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WHAT'S NEW IN METALWORKING

NEW TOOL GRINDER FEATURES 10-SECOND WHEEL CHANGE

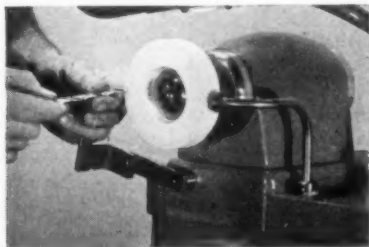
An important feature of the Corlett-Turner Co.'s new G3 Tool Grinder is the rapid change wheel arbors. The manufacturer claims that wheel changes can be accomplished in ten seconds. All wheels are individually mounted on ground tapered arbors which are inserted in a hardened and ground socket in the spindle, and held in place by a draw bar arrangement. No tools are necessary; a slight wrist motion on the aluminum end pieces releases the wheel arbor so that it can be spun off; the reverse motion instantly secures it in place. Once a wheel has been trued, an accurate running wheel is assured, regardless of the frequency of wheel changes.

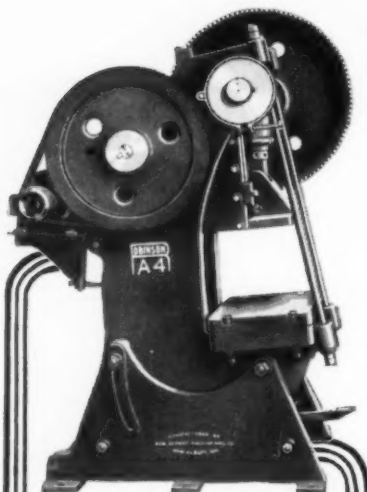
A 3-step pulley arrangement permits the selection of the proper spindle speed for any wheel up to 4" in diameter. A hand lever located in the base raises the motor bracket, after which the belt can be adjusted on the pulleys to the required position in a few seconds. Provision is made to prevent the careless use of a wheel of

larger diameter than that recommended for the speed to which the belt is adjusted. Unless the safety arm is properly positioned for the size wheel conforming to the speed to which the belt is positioned, the lower section of the device bears against the belt, preventing operation.

A collet type arbor of $\frac{1}{4}$ " capacity adds to the flexibility of the unit, permitting the use of all types of mounted wheels, burrs, etc.

On the head casting below the wheel, a surface is provided which is machined square with the spindle, and drilled and tapped to receive any fixtures which may be required for special applications. Besides the standard





The **ROBINSON** *Inclinable* **PUNCH PRESS**

The new and improved Series A Robinson Punch Press is noted for safe, dependable operation. Sturdily built and employing finest construction features, a Robinson Series A offers years of trouble-free operation at minimum maintenance cost. Five sizes now available for immediate delivery.

New Albany Machine Mfg. Co.
NEW ALBANY, IND.

ROBINSON
Inclinable
PUNCH PRESSES

tool rest, which is used largely as a hand rest for freehand grinding, two other special large rests are available. One provides a surface at right angles to the plane of the wheel; it can be swung vertically out of the way to change a wheel, or when not in use. This rest is adaptable for circular form tool grinding and other applications requiring a level surface. The other tool rest has a vertical adjustment and an angular adjustment in two directions; it is useful for sharpening dovetail form tools and single point turning tools, including carbide tipped tools of the same nature, by using a silicon or a diamond wheel.

The G3 Grinder is powered by a 1/3 h.p., 3450 r.p.m. motor. Space is provided in the pressed steel cabinet base for the convenient storage of mounted wheels and other accessories.

The unit's high spindle speeds make it adaptable to many burring, buffing, and polishing operations, and other applications requiring a high speed precision spindle. For these uses, wire wheels, polishing wheels, etc. can be mounted on the standard arbors, and mounted wheels, burrs, etc. on the collet arbor.

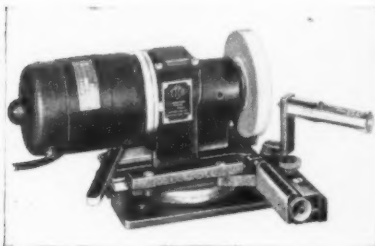
For complete details, write for illustrated bulletin G3, to:

Corlett-Turner Co., Dept. BB
1001 S. Kostner Ave.
Chicago 24, Ill.

THE ETCO MACHINE FOR DRESSING DIAMOND WHEELS

A new machine for dressing and shaping diamond wheels is introduced by Eastern Tool Co. This unit has been developed to remove dull diamond particles and bonding material from the periphery of a diamond wheel, leaving a true face with new, sharp diamond particles exposed. The diamond wheel can be dressed by removing a minimum of material from its surface, thereby increasing its useful life. This is performed without removing the diamond wheel from its spindle, nor changing the normal rotational speed.

In addition to straight refacing, angles can be cut to a fine degree of accuracy; by the addition of the radius attachment, various concave and convex radii may be transferred into the cutting face of the diamond wheel with accuracy and speed. Intricately shaped carbide pieces, for dies and cutting tools, as well as resinoid, vitrified, and metal bonded diamond wheels can be formed with ease.



The machine consists of a small dressing wheel rotated at the correct relative speed against the diamond wheel to be dressed. The wheel shaft housing is mounted on protected ways that permit a smooth reciprocating motion to be given to the dressing wheel along its axis. The ways are mounted on a swivel base that may be rotated to dress any desired angle into the diamond wheel.

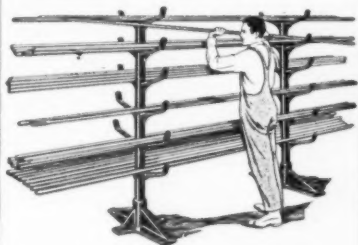
The radius cutting attachment may be secured to shape a radius in the dressing wheel which may in turn be transferred into the diamond wheel. The desired radius can be set by a micrometer adjustment built into the radius attachment.

The machine has a compact design, adaptable to most machines on which a diamond wheel is usually run. Accurate alignment of the machine is insured by several true-reference surfaces in the machine base. For complete details of this new unit, write:

Eastern Tool Co., Dept. BB
Box 363
East Hartford 8, Conn.



Each BROWN SECTIONAL RACK combines five major and several minor features of design, all of which save money for its owner. The time previously lost in end-hauling each bar of stock its entire length from the old-style, closed-side Rack is saved by the Brown Rack which requires but a few inches of side movement.



Each length, width and thickness of stock is displayed in Gold-Fish visibility for instant selection and workmen waiting for stock are served without waste of time. The BROWN SECTIONAL RACK is a simple, durable article built in five styles from standard interlocking metal sections. It cannot burn, sag or twist; unattached to the building, it can be moved at will. Changes in length of stock can be met by moving the units nearer or further apart, while increases of stock can be met by simply adding more standard units. Built from metal throughout, depreciation is practically nil. SEND FOR BULLETIN NO. 26-B.

BROWN SECTIONAL RACK

BROWN ENGINEERING CO.

126 N. THIRD ST. READING, PA.

RACKS • VISES • CLUTCHES • COUPLINGS

NEW BROWN & SHARPE AUTOMATIC SCREW THREADING MACHINE

Unusually high production of small screws, nuts and bushings is possible with this new design machine because it has been specifically designed to take full advantage of overlapping operations and to reduce idle time to a minimum.

Both the work spindle and threading spindle rotate in the same direction but at different speeds. The difference in speeds permits the die or tap to cut at the required surface speed for threading while the work rotates at suitable speed for turning or other operations. Threading dies are backed off simply by automatic stopping of the threading spindle. For the production of bushings, the die spindle is used as a drill spindle.

The principle of overlapping operations is shown by the diagram of the simultaneous tandem production of a screw.

Threading and cutting-off (partial) are performed on one piece while initial operations are being made on the succeeding piece.

In general, this new design automatic screw threading machine is similar to the Brown & Sharpe automatic screw machines, having all of their latest improvements and refinements. A slotting mechanism provides for slotting screws and similar parts and when the machine is used for tapping, the transfer arm of the slotting mechanism provides for drilling the hole in the work previous to tapping.



Die and spindle speeds are provided suitable for any material—16 work spindle speeds from 5000 to 454 r.p.m.; 32 threading spindle speeds from 7000 to 545 r.p.m.; giving 32 changes of thread cutting speeds, 2000 to 91 r.p.m., provided by difference in speed of the work spindle and threading spindle.

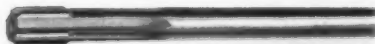
The machine takes stock to $\frac{3}{8}$ " diameter and threads any length to 1". Greatest distance from front of chuck to face of die, 27 $\frac{1}{8}$ "; least $\frac{1}{8}$ ". For further information write:

Brown & Sharpe Mfg. Co.
Dept. BB, Providence, R.I.

SUPER TOOL CARBIDE REAMERS

A new line of carbide tipped reamers, known as "Ream-Rite", is an-

nounced by Super Tool Co. They are now available from stock, in sizes $\frac{1}{4}$ " to $\frac{3}{8}$ ". Mr. H. E. Berry, Sales Mgr., advises that while not offering all the features of Super's standard carbide tipped reamers, the new "Ream-Rite" offers the same superior finish and long wear that is customarily obtained with carbide. These reamers are not designed for line reaming set-ups, but



are ideal for automatic and hand screw machines and work that does not require a long flute to operate through bushings. For details, write:

Super Tool Co., Dept. BB
21650 Hoover Road
Detroit 13, Mich.

DEEPHOLE INSPECTION LIGHT

This device was developed specifically for inspecting, in quantities, the bottom and sides of small deep holes in machined or cast parts. With the use of the Deephole Inspection Light, good visibility is obtained in holes only $\frac{1}{8}$ " in diameter, and 6" deep, holes $\frac{1}{4}$ " in diameter, 30" deep. The sides and bottom of extremely deep holes can be inspected with this concentrated beam.

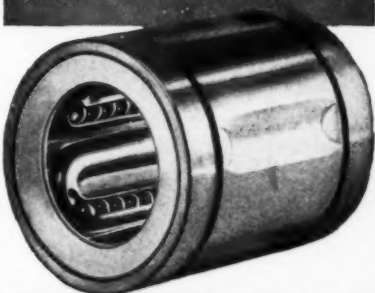
The inspection light is designed so that the operator looks down the center of the light beam into the hole. The line of sight of the operator is surrounded by a cylinder of light. The device is manufactured in two convenient models, a portable light for inspectors, and a bench light for multiple inspection.



tion. The bench light (illustrated) is used with a separate transformer and reel for light weight and compactness. The bulb used is a standard automotive bulb of 21 candlepower. For further details, write:

The Extractor Corp., Dept. BB-16
25743 W. 7 Mile Road
Detroit 19, Mich.

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BALL BUSHINGS

Sliding linear motions are nearly always troublesome. Unlimited travel BALL BUSHINGS can be used to tremendous advantage on guide rods, guide posts, reciprocating shafts and for support of any mechanism that is moved or shifted in a straight line.

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ELIMINATE BINDING and CHATTER
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LOW FRICTION and WEAR
LONG LIFE — LOW MAINTENANCE
SOLVES SLIDING LUBRICATION PROBLEMS

Now available for $\frac{1}{16}$ ", $\frac{1}{8}$ ", $\frac{1}{4}$ " and 1"
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Write for literature and name of our representative in your city. No obligation, of course.

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Dept. C., MANHASSET, N. Y.

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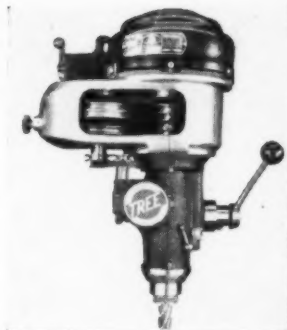
808-T 51195 15

ALL-ANGLE MILLING HEAD ATTACHMENT

The Tree Tool & Die Works announces the new milling head attachment to do all-angle milling, drilling, and boring. Special features include an automatic collet closer, wide ranges of speed, and rugged construction. The spindle, of alloy steel hardened and ground from collet seat to special spline, provides the rigidity necessary for the wide range of milling operations to which the attachment is adapted.

The acknowledged speed of automatic collet operation has been applied to operations where cutting tools must be frequently changed or rigidly held for accurate and heavy duty operations. Through the use of a yoke on the attachment, a downward pull on the hand feed lever loosens the cutting tool, while an upward push again locks it in readiness for operation. One hand adjusts the cutter and positions it, while the other locks it.

A new method of spindle drive has proved satisfactory for transferring power from the motor to the spindle. An adjustable unit eliminates backlash, and requires little adjustment, since all wearing parts are alloy steel, hardened and ground.



The construction provides for eight speeds in two ranges—140 to 3500 r.p.m., or 210 to 5200 r.p.m. A ½ h.p. motor at these speed ranges provides the necessary power for any operation undertaken. The slow speeds are obtained without using extremely small pulleys.

Another feature is the power down



CHECK RUNOUT TO
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BENCH CENTER

COMPLETE RANGE AS FOLLOWS:—

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6" x 36"	42" x 48"	12" x 72"



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A precision tool for testing and checking parts between centers. Both heads adjustable, locked in place by lever-operated clamps. Work is held between one fixed center while spring loaded retractable center clamps work in position. Dial indicator with adjustable holder available as extra equipment.

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 HEAVY DUTY
Plunger Clamp



DE-STA-CO MODEL NO. 620
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This new, versatile, plunger type clamp is designed to increase production and assure positive parallel clamping action during welding, drilling, assembly or milling operations. Excellent for quick-action and the locking of work in jigs and fixtures.

Plunger rod is tapped to receive $\frac{3}{8}$ "—16 bolt for adjusting. Reverse action permits operating ease in restricted or congested areas and where working height is limited.

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feed to the quill. Operated by a knurled knob on the pinion shaft, the feed can be engaged at any point of the stroke. The hand feed lever is engaged at all times, and is readily adjusted to any position. For complete information on this device, write:

**The Tree Tool & Die Works, Dept. BB
Racine, Wis.**

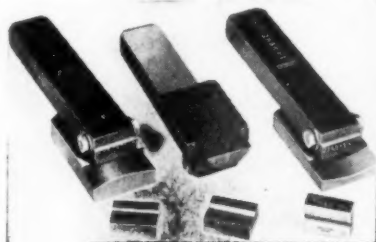
GUIDED HAND STAMPS SIMPLIFY PART MARKING

A new line of "locating guide" stamping devices for annular marking which uses a replaceable solid logotype, has been developed by New Method Steel Stamps, Inc. Parts like gears, tubing, bushings, etc., can be hand-stamped around a flat radius with such information as heat treat codes or part numbers, easily and accurately.

The new annular marker consists of a holder, a solid logotype bearing the desired characters, a clamping pin, and the locating guide, all of hardened tool steel. These locating guides are

arranged for marking either from the o.d. or the i.d. (see photograph).

The grooved logotype is inserted into the handle and held with the clamping pin, and the locating guide is attached to the holder with Allen screws.



In operation, the guide is placed against the o.d. or the i.d. of the part to be marked, insuring perfect alignment. For details, write:

**New Method Steel Stamps, Inc.
147 Jos. Campau Ave., Dept. BB
Detroit 26, Mich.**

LYMAN BENCH PRESS

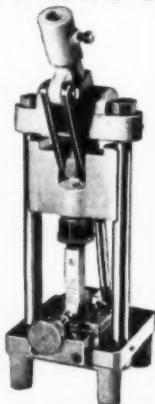
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Hand Operated**



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Complete with handle

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SWITCHES ARE NOT SUBJECT
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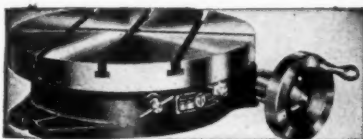
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PRECISION**

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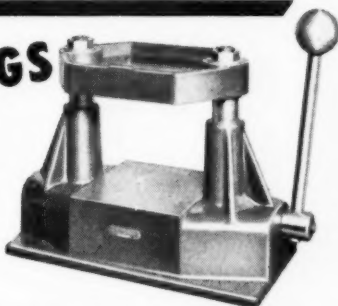
128 LAFAYETTE STREET

NEW YORK 13, N. Y.

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YOU CAN TRUST

- MECHANICAL SIMPLICITY
- ADAPTABILITY
- RUGGED CONSTRUCTION
- CHIP PROTECTION
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- MAXIMUM SAFETY



The Woodworth "CONE-LOK" jig utilizes the full braking power of its perfectly mated male and female cones.

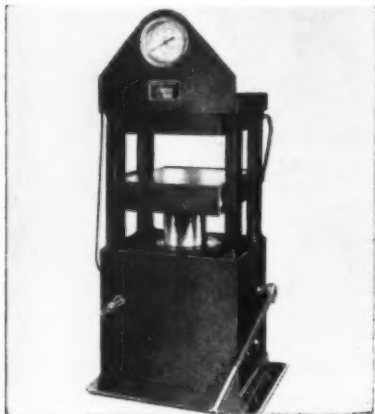
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BENCH PRESS ATTAINS 30-TON PRESSURE

The M & N Machine Tool Works, Inc. announces a new 30-ton hot plate hydraulic press designed particularly for plastic laminating, plastics and rubber molding, powdered metal, forming, hobbing, and other applications where accuracy, speed, and ease of operation are essential.



The new unit is adapted for use in the rubber industry where a molding press is desired for short run jobs and experimental work. Outstanding features of the press include electrically-heated, thermostatically-controlled platens, totally enclosed hydraulic system, dual pressure pump, compactness for

bench use, large platen area and all-steel construction. Size of base is 16" x 12", overall height: 42"; platen size: 12" x 12"; total pressure on platens: 30 tons; daylight opening: 10"; stroke: 6" maximum; ram diameter: 5". For details, write:

**The M & N Mach. Tool Works, Inc.,
Dept. BB, 156 Orono St.
Clifton, N. J.**

SHEARCUTTER PRE-SHARPENED TOOL BIT

A new tool bit, the Shearcutter, which takes cuts two to three times its normal size, and greatly reduces production time is announced by the Shearcut Tool Co. Utilizing the principle of molecular cleavage, this device cuts metal with a knife-like action, instead of chiseling it off. It embodies a pre-sharpened cutting edge and chip pressure channel which insures true shearcutting. Savings in production are said to amount to as much as 50%; in power consumption, frequently 70% or more.

Precision tolerances may be held with the Shearcutter bits, and finishing cuts often may be eliminated. The tool may be used on both ferrous and non-ferrous alloys without changing the original grind. It is emphasized that with the knife-like action of these tool bits heavier cuts may be taken with extreme ease. For further information about these tools, write:

**Shearcut Tool Co., Dept. BB
Box 746, Reseda P. O.
Los Angeles, Calif.**

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OPTICAL PYROMETER

Unique construction enables operators to rapidly determine temperature even on minute spots, fast moving objects or the smallest streams; no correction charts, no accessories, no upkeep.

THE PYROMETER INSTRUMENT CO.
102-105 Lafayette St., New York, N. Y.

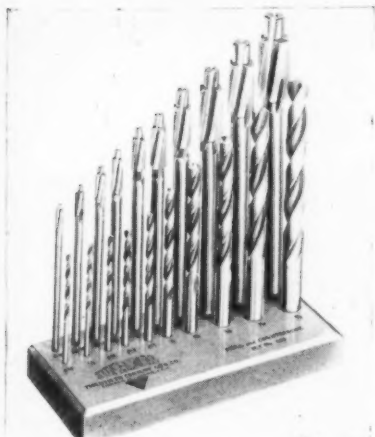
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"Superbore" Drills and Counterbores, made in decimal sizes from

superior-grade high-speed steel now come in sets of standard, 1/64th" and 1/32nd" oversize for each size so that there is no mistaking as to which one to use.

These SuperBore drills and counterbores are available in sets consisting of standard sizes or oversizes above the standard dimensions. Each set is individually serial numbered for inventory control and for identification by its owner, when there are several sets used in one plant. Size markings are indicated halfway up on the shanks, avoiding possible obliteration by drill press chucks.

By being slightly oversize, they provide that shade of size difference that accomplishes excellent results. For complete information write:

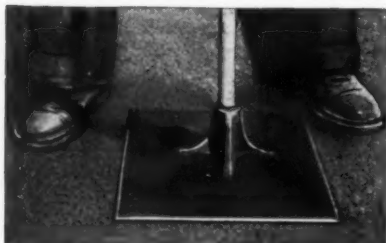
**Twentieth Century Mfg. Co.,
Dept. BB
3722 Montrose Ave.
Chicago 18, Ill.**

A large illustration showing a 1-ton radial load test setup. A drill bit is shown gripping a workpiece. Below the workpiece, two men are shown pulling on a rope attached to a weight labeled "1 TON". The text "1 ton radial loads can't budge tools gripped in UNIVERSAL COLLET CHUCKS" is prominently displayed. At the bottom, the text "UNIVERSAL ENGINEERING CO. FRANKENMUTH, MICHIGAN" is shown.

**1 ton radial loads
can't budge tools
gripped in UNIVERSAL,
COLLET CHUCKS**

**UNIVERSAL ENGINEERING CO.
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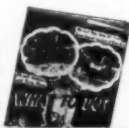
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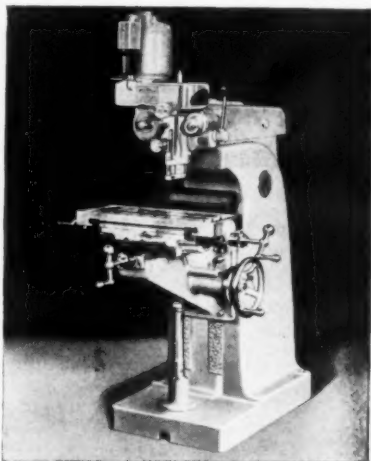
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Please send me complete **INSTANT-USE**
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Address

GORTON SWIVEL HEAD— UNIVERSAL HEAD MILLING MACHINE

Here is a small size machine which is rugged and accurate, yet convenient to operate since it permits the operator to sit at the machine in a comfortable position. It is a ram type, hand feed vertical milling machine and is available with either swivel head or universal head, making it adaptable to a



wide range of work. The heavy column, sensitive table and saddle movements, and quickly adjustable swiveling or universal head with the Super-Speed Spindle make this machine useful for the toolroom or die-mold shop and for production milling on small parts. The machine is called the No. 0-16A Gorton Super-Speed Swivel Head-Universal Head Mill (Trade Mark Reg. U.S. Pat. Off.).

Features include positive spindle brake for instantaneously stopping spindle and locking it in place when changing cutters; a spindle lock for holding the spindle at desired position for setting-up and milling operations; a screw type spindle depth stop graduated in thousandths which provides positive and accurate setting of cutter depth; quick action, position belt ten-

sion adjustment; an adjustable ram which provides increased work capacity.

The head on the adjustable ram on this machine is furnished with either a single swivel graduated 45° left and 90° right (will swivel 360° parallel to table) or a universal head providing same adjustment as above, but with an additional 45° front and back movement at right angle to table. Both heads incorporate a new spindle design featuring precision anti-friction bearings permanently grease-sealed. A ½ h.p., high torque, reversible motor provides 6 spindle speeds from 300 to 5,000 r.p.m. Ask for O-16A Specification Sheet for detailed information.

Geo. Gorton Machine Co., Dept. BB
Racine, Wis.

NEW SAPPHIRE PLUG GAGE

These metal tipped sapphire plug gages, which withstand accidental damage, while preserving the advantage of sapphire's extreme wear resistance, are the latest addition to the industrial sapphire tools and gages manufactured by the Sapphire Products Division of the Elgin National Watch Co. They were first introduced at the recent A.S.T.E. Industrial Exposition in Cleveland.



The metal leader is bonded to the gaging member by an exclusive new method. Combined with a flexible handle, it is claimed that this tool will produce more gagings per day with less operator fatigue. It necessitates no wear tolerance, thus opening manufacturing tolerances. Sizes range from .020" to 1.000". For additional information write:

Elgin National Watch Co.
Sapphire Products Div., Dept. BB
Aurora, Ill.

Buy KIPP AIR GRINDERS Because

The RPM's stay up while grinding... not only when the grinder runs idle.

It is an established fact that surface speeds must stay up to approximately a mile a minute if you want to grind — not just rub. The speed of Kipp air grinders drops but slightly when put to work. That means better work — longer wheel life.

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MODEL JA
50,000 R. P. M.

\$42⁰⁰

IN U. S. A.



Weight 12 ounces;
length 6 3/4 inches;
chuck size 1/8 inch.
Wheel guard removed for better illustration.

MADISON-KIPP CORP.
207 Waubesa St., Madison, Wis., U. S. A.

- Skilled in DIE CASTING Mechanics
- Experienced in LUBRICATION Engineering
- Originators of Really High Speed AIR TOOLS

NEW QUIET SUNDSTRAND CONSTANT VOLUME PUMP

The Sundstrand Machine Tool Co. (Hydraulic Division) has added to its line of hydraulic equipment a new constant volume pump for 1000 p.s.i. service. This pump is useful for materials handling equipment, industrial heating units, and similar installations. The present Model 5W Pump is made in eight different capacities, ranging from 3 to 10 g.p.m. at 1200 r.p.m.

The principal feature is the patented Rota-Roll pumping member design, with which the smaller roller, or inner member is keyed to a shaft and drives the outer member at a speed 25% lower than the speed of the motor. As the centerline of the pumping members is nearly concentric with the centerline of the pump housing, the unit is small and compact. The pumping members have a special tooth form of sturdy design, providing longer pump life. The rotating roller and rotor are self-emptying, eliminating interference with the smooth, uniform flow of oil. Quiet operation is assured, because the Rota-Roll pumping members and inlet port design reduce cavitation at the inlet



port. Thorough testing of pump shows an overall efficiency of 85%. Model 5W Pump is suitable for direct coupling drive only. Other models requiring sheave or pulley type drive are available. For complete information write: Sundstrand Machine Tool Co., 2535 Eleventh St., Dept. BB Rockford, Ill.

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The lowest-priced wire and rod cutter on the market. The hardened cutters last indefinitely.

Hand operated. A giant for work, cuts wire and rods up to 3/8-in. round or 1/2-in. square and band iron up to 1/2 in. by 2-in. Adjustable stop for repeated cuts to same length. Large or small, your shop can use a WONDER CUTTER.

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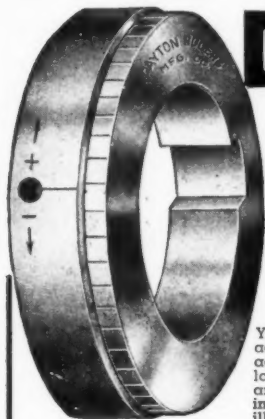
for JIG BORING WORK

Here the Super-Spacer is demonstrating another of its advantages to any tool room. Equipped with a face plate for exact location of work, it can be used on your jig borer to save indexing time, and production cost per piece. The Super-Spacer takes milling, drilling, grinding, planing, slotting, boring and other operations in stride. Investigate its benefits to your shop. Write Dept. S7.

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Special

**THE HARTFORD
SPECIAL MACHINERY CO.
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FAST, ACCURATE SPACING

Graduated in thousandths, you have plus or minus .0005" at your fingertips with

**DAYTON ROGERS
ADJUSTABLE
SPACING COLLARS**

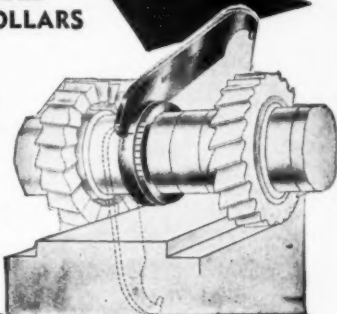
You can make an accurate, positive adjustment just by loosening the cutter arbor nut and making adjustment as illustrated.

Made in 12 standards for cutter arbors from $\frac{1}{8}$ " to 2". Write for illustrated Bulletin 120-7.

DAYTON ROGERS MFG. CO.
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**SIDE MILLING
CUTTERS**

**GANG MILLING
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CUTS ANY SHAPE

CUTS ANY SIZE

CAPACITY UP TO 1/4" STOCK

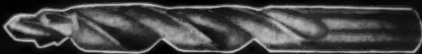
Here's the shear that offers best performance features. Cutting speed 6' per minute. High grade tool steel cutters. Write today for details. Prompt shipment.

MARSHALLTOWN MFG. COMPANY
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TOOLS . . .**

Make your tooling problem ours. We are equipped to make cutting tools of all kinds to YOUR SPECIFICATIONS, or our engineers will design the proper tools to do your job. YOU CAN BANK ON OUR DELIVERY PROMISE. We make Eccentric Relief Cutting Tools, Carbide-Tipped Cutting Tools, Step Drills, Step Reamers, etc. Tolerances are maintained exactly. Send us your sketch or blue print for quotation. If it is a Cutting Tool We Make It.

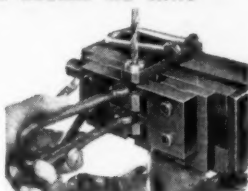


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3614 N. KILBOURN AVE. CHICAGO 41, ILLINOIS

VARIETY OF APPLICATIONS AVAILABLE WITH HEUSER JIG JAWS

A wide variety of jaws has been devised by Heuser Manufacturing Co. to enable "Johns" Drill Jigs to be used for drilling and tapping work pieces never before considered adaptable for these jigs. Such operations as drilling holes in loop handles, deep drilling in long shafts, are comparatively simple with the use of these jigs whose applications are almost universal.

The universal jaws, furnished as standard equipment, enable end drilling and tapping to be accomplished on a wide variety of diameters; cross hole drilling with the same jaws is now simplified, requiring a set-up of only a few minutes. Many special jaws for out-of-the-ordinary applications have been designed; de-

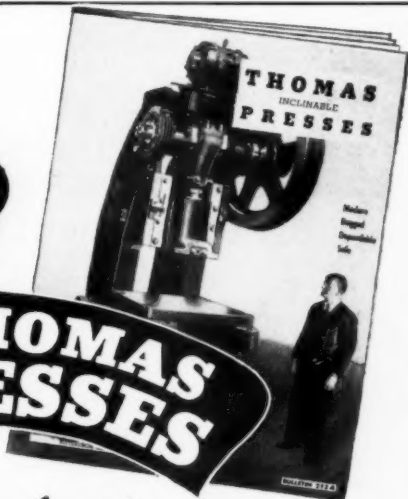


tailed descriptions are available upon request to:

Heuser Manufacturing Co., Dept. BB
1638 N. Paulina St.
Chicago 22, Ill.

Send for this
NEW BULLETIN

on **THOMAS
PRESSES**



In this new Bulletin you'll find specifications and illustrations of the complete Thomas line of Open Back Inclined and Horn Type Presses. Ask for Bulletin 212-A.

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To insure fast service on tungsten carbide tools we have inaugurated an "over-the-counter" service at Detroit and in many other principal cities. From these stocks you can secure — in person or by mail — the complete line of Willey's standard tools and blanks, as well as many tools heretofore considered specials — reamers, face mills, shell end mills, core drills, centers, masonry drills, slotting cutters, gages, wire drawing dies and diamond dressers.

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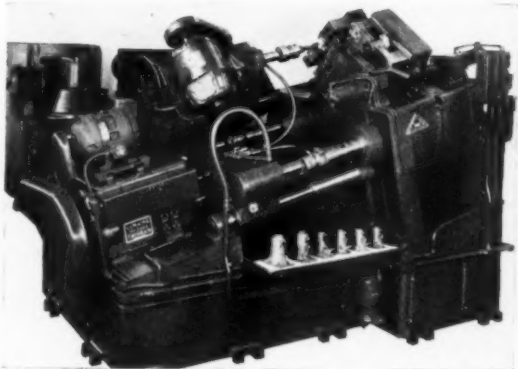
SOLE MAKERS OF WILLEY'S METAL

1342 W. Vernor Highway

Detroit 1, Michigan

LEMAIRE AUTOMATIC INDEX TRUNNION MACHINE

This recent development of the LeMaire Tool and Manufacturing Co. is a 5-station automatic index trunnion machine to bore jack bodies. The machine consists of a rigid fabricated base which houses the coolant system and supports the trunnion index mechanism. A LeMaire No. 5000 twin ram self-contained hydraulic drill unit with a 3-spindle boring head is mounted on the left end. A LeMaire No. 150 master lead screw tapping unit mounted on a hydraulically actuated sub-slide is positioned at Station No. 5. The units are powered with variable speed motors. The fixtures are hydraulically operated, self-centering, vise type, clamped and unclamped by air cylinders mounted on trunnion support at Station No. 1.



The cycle of operations is as follows: Station No. 1 is for Load and Unload. At Station No. 2, the work pieces are rough bored to 2-7/16" dia., chamfered 1/16" x 45°, rough faced 4 1/2" dia., and rough bored 4-3/16" with a plus .002,

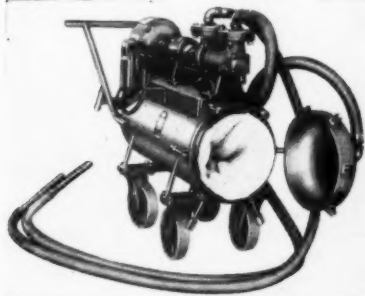
minus .000 tolerance counterbore. At Station No. 3, the work is finish faced at $4\frac{1}{2}$ " dia. At Station No. 4, finish bored 2-7/16" dia., finish bored, 4-3/16, with plus .002, minus .000 counterbore. At Station No. 5, the work gets a 2½-20 tap. Production is approximately 150 pieces per hour.

Special features include the machining of parts in an angular position in order to eliminate chip pockets; provision of ample coolant which flows through the center of all cutting tools and taps. The variable speed motors provide for infinite control of spindle speeds so that a constant cutting speed can be maintained for all parts shown. For complete specifications, write:

LeMaire Tool & Mfg. Co., Dept. BB
2657 S. Telegraph Road
Dearborn, Mich.

NEW COOLER FILTER IS MOBILE, EASY TO EMPTY

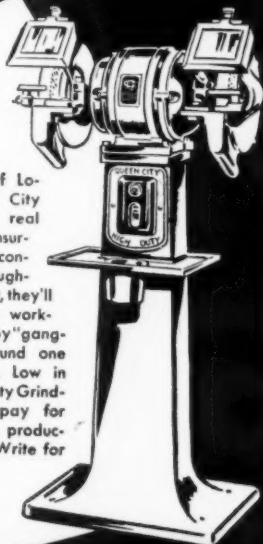
Honan-Crane Corporation offers a new mobile machine tool coolant filter which offers effective filtration plus simplicity of operation and ease of emptying. The new unit is mounted on four 8-inch caster wheels and is powered by its own motor and vacuum pump and operates on a continuous circulation arrangement from a suction hose through the filter tank and discharge hose. Flow rate is 12 gallons per minute. Coolant is processed in the



machine sump and the individual machine can be cleaned up without slop or mess or time-consuming manual raking in an average of ten minutes or less. Abrasives do not enter the pump.

SAVE TIME, MONEY

with rugged
**QUEEN CITY
GRINDERS**



A battery of Low-Cost Queen City Grinders is real production insurance. Placed conveniently throughout your plant, they'll stop wasted work-hours caused by "ganging up" around one lone grinder. Low in cost, Queen City Grinders quickly pay for themselves in production gained. Write for Catalog.

QUEEN CITY MACHINE TOOL CO.

217 E. Second St.

CINCINNATI 2, OHIO



THE ONLY ABRASIVE WITH

DIMINISHING ACTION



For faster precision fitting of gears, valves, cylinders, bushings, and bearings, use Timesaver Lapping Compound. A powdered abrasive prepared especially for applications where fine lapping, perfect control and freedom from imbedment (charring) are imperative.

- Absolutely non-imbedding
- Diminishing (self-reducing) action
- Becomes totally inert thru use
- Laps all metals from soft babbitt to hardened steel
- 29 years of successful use

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Filtering medium is a close-woven cloth bag within a perforated metal basket. Dirt and chips are held in the bag which is easily removed from the basket for emptying. Lid is self-locking, quick-opening type. The entire unit will tilt easily at 45 degree angle on back wheels and auxiliary legs to facilitate emptying. Filter bag can be washed in a degreaser and reused. Literature available from:

Honan-Crane Co. Dept. BB
911 Sixth St.
Lebanon, Ind.

MIDGET SCREW DRIVER ATTAINS 2000 RPM

The Rotor Tool Co., Cleveland manufacturers of portable pneumatic tools, has announced their new Midget M-851 Nut Setter or Screw Driver. The unit is equipped with an auxiliary clutch for starting the main clutch in motion; the main clutch is the two-ball impeller type with an adjustable tension spring, giving uniform setting of nuts or screws, independent of variations in air pressure or length of time applied to the operation.

The tool is provided with a 9/32" square drive for nut sockets up to 1/4"; it also has a 1/4" hex socket for screw driver bits up to No. 12 screws. Speed



is either 1000 or 2000 r.p.m. The device is available with either pistol type or lever throttle. A means of speed control is also provided.

For complete details, including various type adjustable heads for specialized operations, write to the manufacturer:

The Rotor Tool Co., Dept. BB
Cleveland 12, Ohio

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Heavy Duty

Live Centers

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catalog on
live centers

Adapted
for heavy
duty work.
Precision type
ball and roller
bearings assure
maximum capac-
ity for high speed
production and long
service.

NIELSEN, INC. LAWTON, MICH.

SPRING-AIR PRESS

A compressed air op-
erated press to re-
place the Kick press
featuring



- Adjustable Blow 0 to 5,000 lbs.
- Controllable Speed Push Stroke 500 lbs.
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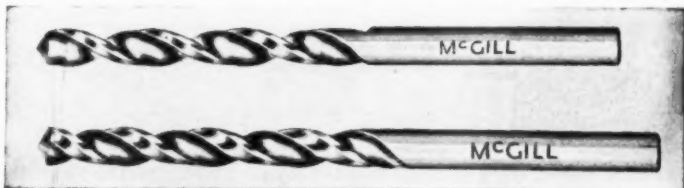
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McGILL'S DRILLS - Solid and Carbide Tipped



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CARBIDE
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Right**

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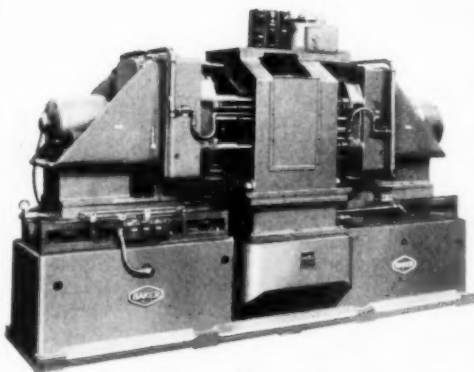
McGILL CARBIDE TOOL CO.

4612 Woodward Avenue

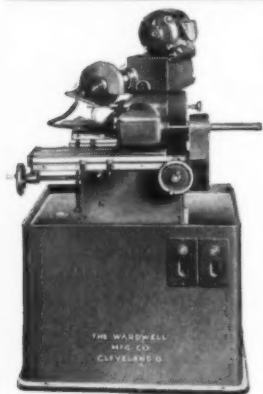
Detroit 1, Michigan

BAKER TWO-WAY HORIZONTAL MACHINE

Baker Brothers, Inc., has recently developed a two-way horizontal machine for the high production machining of automobile connecting rods and caps. The new unit, of special floor-type construction, is furnished with a six-station trunion type power index fixture arranged to clamp one connecting rod and cap at each station, and utilizes two Baker Model 15 x 16 hydraulic feed saddle units. The saddles of these units are equipped with hardened steel replaceable flat ways that allow a 16" saddle travel. A positive depth stop and delayed reverse attachment can be included when desirable.



In the illustrated installation, the right hand unit is equipped with a 20-



Carbide Drills Fluted from Solid *.... indexes automatically* **Grinds and Sharpens**

**Taps — Reamers
Milling Cutters — End Mills — Saws**

Grinding angles up to 45°. Spiral leads as short as $\frac{5}{16}$ " to one turn. Sharpens saws in gangs up to 7 $\frac{3}{4}$ " long. Write for Bulletin 90 F.S.

**THE WARDWELL
MANUFACTURING CO.**
3165 FULTON ROAD
CLEVELAND 9, OHIO

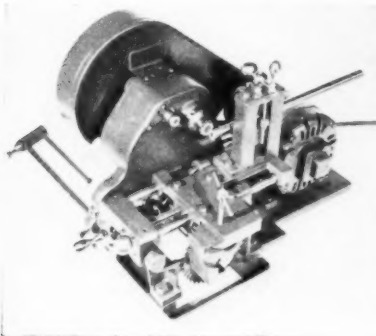
spindle fixed center multiple head, assembled with a self-centered lubricant pump, and driven by a 10 h.p. motor; The unit at the left drives a 12-spindle head, powered by a 7½ h.p. motor. The 15 x 16 unit has a high rate of rapid traverse and saddle feed, and may be mounted in horizontal, vertical or angular planes.

Hydraulic power is provided for each of the 15 x 16 saddle units by a separate variable delivery portable pump-sump unit, mounted on casters. The caster mountings, together with self-sealing connectors, permitting breaking the line without loss of hydraulic fluid or influx of air into the hydraulic system, make this a readily exchangeable hydraulic power unit, that greatly reduces down-time. For more information on the new Baker Two-Way Horizontal Machine, write for circular No. 69955 to:

**Baker Bros., Inc., Dept. BB
Toledo, Ohio**

HYLAND COMBINATION MILLING MACHINE

The recently introduced Hyland Combination Milling Machine is a small, practical unit for large or small shops. It is designed to save set-up time, and is claimed to be especially



useful on short run, high speed jobs. The Hyland unit provides two speeds for rapid, accurate cut-off of mild steel, brass, high carbon alloy, or tool steels.



**STEPPED UP
PRODUCTION
COSTS DOWN**

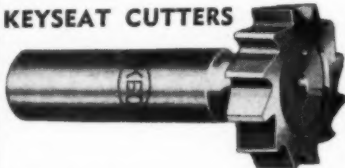
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TECHNITE
HACK SAW
BLADES...**

Companies with important delivery schedules to meet are relying more and more on Capewell's *Technite* for their hardest cutting jobs. They have found that *Technite* cuts tough alloy steels faster, yet lasts longer than ordinary blades. Deliveries are made on time because production is speeded up... yet costs are kept down because of the longer life of *Technite*. Ask your distributor for *Technite*.

The **CAPEWELL**
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Manufacturing Co.
HARTFORD 2, CONN., U.S.A.
METAL WORKING CRAFTSMEN FOR OVER 65 YEARS

KEO**CENTER DRILLS**

Made of finest high speed steel. Available in all standard sizes. Always in stock for immediate delivery. Specials made to your specifications.

KEYSEAT CUTTERS

High speed. Right hand. $\frac{1}{8}$ " shank. Diameters from $\frac{1}{8}$ " to $1\frac{1}{2}$ ". Standard sizes in stock for immediate delivery. Complete set —41 sizes—available in sturdy, hardwood box. Saves time and money, because you always have the size you need.

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High speed steel. Reamers from $\frac{1}{4}$ " to 1" regularly furnished with 60°, 82°, 90° included angle. Specials made to your specifications.

LATHE MANDRELS

Precision made of tool steel, hardened and accurately ground. Tapered .0005" to the inch. Mandrels from $\frac{1}{8}$ " to 1" are .0005" undersize at small end, from $1\frac{1}{4}$ " to 3", .001" undersize. Immediate delivery.

Write for Literature

Illustrated literature and prices on all KEO Products mailed on request.

KEO CUTTERS

19326 Woodward - Detroit 3, Mich.

It is provided with an adjustable stop which may be set to cut lengths up to 15" or longer. Bar stock can be handled up to 1" diameter; a 5" x $\frac{3}{32}$ " or $\frac{1}{8}$ " metal slitting saw is used.

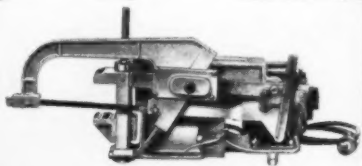
The Hyland machine mills flats, squares, Woodruff key slots and keyways. The machine length is 23"; width, 14", height, $14\frac{1}{2}$ ". It requires a $\frac{1}{4}$ h.p., 1750 r.p.m. motor. For additional information, write:

The Hyland Machine Co., Dept. BB
40 Potomac St.
Dayton 1, Ohio

PORTABLE POWER HACK SAW

A light weight, portable power hack sawing machine, the Hand-I-Hack, which can be carried to the job with one hand, and operated from any 110-volt a.c. outlet, has been designed by the Lipe-Rollway Corp. It has been found useful by electricians for cutting conduit, by tool makers for small sawing operations in die making and fixture work, by plumbers and pipe fitters, and in many other trades.

The Hand-I-Hack has a patented sawing action which eliminates the use of weight, and is adjustable for cutting in a range from bar stock to very thin-wall tubing. The work holding vise capacity is 3" x 3", and will

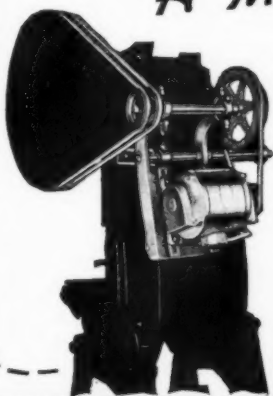


hold $2\frac{1}{2}$ " iron pipe. The vise is swivel mounted and calibrated for cutting accurate mitres. The vise can be clamped to a work piece such as a vertical pipe or tangent brace, and cut it off at right angles. The unit is built for precision work, and is rugged enough to last many years as a portable tool. For further information, write:

Lipe Rollway Corp., Dept. BB
Syracuse 1, N. Y.

A Modern

MOTOR DRIVE FOR EVERY MACHINE TOOL



The Modern Motor Drive shown here fills an urgent demand for an easily mounted economical Punch Press Drive.

Utilizing the jackshaft principle, permitting the use of standard 1750 R.P.M. Motors.

Brackets for direct drive from motor to flywheel are also available from stock.

• Write for catalog showing complete line of Modern Drives for other machine tool equipment.

THE NICHOLS ENGINEERING COMPANY...
2400 W. MADISON ST. CHICAGO 12, ILL.



"TAILOR" THE SPEED TO FIT THE JOB WITH THE TAYLOR MADE VARIABLE SPEED DRILLING MACHINE

- The exact speed required for drill diameter and material at the turn of a knob.
- Exact control of speeds means less breakage, fewer grinds, higher efficiency.

TWO MODELS — 1-6 spindles

M-125 $\frac{3}{8}$ Cap. (Illustrated)

M-96 $\frac{7}{8}$ Cap.

WRITE FOR BULLETIN DESCRIBING BOTH MACHINES



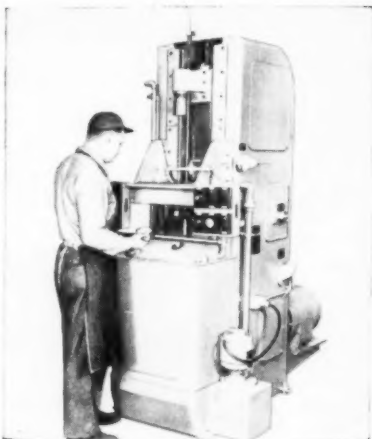
THE TAYLOR & FENN CO. HARTFORD 1, CONN.

VERTICAL HYDRAULIC BROACHING MACHINE HAS -10-TON CAPACITY

The American Broach & Machine Co. announces the addition of a new unit, the model VP-2-8-24, to its line of Vertical Pull-Up hydraulic broaching machines for the high production internal broaching of small parts. Operating principles feature push-button operated electrical controls, arranged to complete one full cycle on semi-automatic operation. Provision can be made to stop the machine at the end of each broaching stroke for step-cycle operation.

Multiple tooling can be provided for greater production by increasing the number of broaching stations. Fully automatic operation is possible by building a hydraulic interlocked loading slide into the machine with a magazine type loading unit.

The unit is provided with floor loading height, with ample work space between the angle table and the work table. The controls are easily accessible to the operator on both sides of the machine. The unit has a normal



broaching capacity of 8 tons, maximum of 10 tons. The stroke is 24", with vari-



With the **HOWE LINDSEY
AUTOMATIC
SAW SHARPENER**

- HACK SAWS
- BAND SAWS
- CIRCULAR SAWS
- MEAT SAWS

HOWE AND SON Inc.
HINSDALE N. H.



**Famous
for
Stamina**

This new, streamlined bench type grinder assures fast, quality finishing on metals, plastics, wood, fibre... at low cost. Built to machine tool specifications, Standard D-4 is equipped with improved band tension control and specially designed protective motor hood 4x36 1/4" band. The ideal portable unit.

**OTHER STYLES AND SIZES IN NEW
MANUAL ON FINISHING—WRITE TODAY**

WALLS SALES CORP.
306 E. 38th St., New York 16, N. Y.

able broaching speed of 15 to 24 feet per minute. Coolant pump and piping hydraulic pumping unit, speed control unit and pressure gage are included. For additional specifications, write:

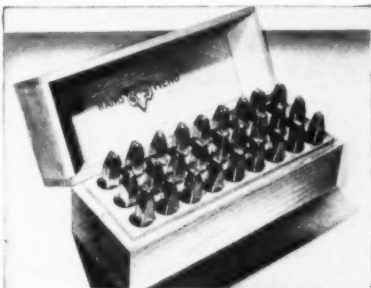
**American Broach & Machine Co.,
Dept. BB
Ann Arbor, Mich.**

METAL MARKING STAMPS IN STANDARD OR REVERSE CHARACTERS

A line of metal marking stamps with striking heads tempered by an exclusive process said to prevent chipping or mushrooming, is announced by the Acme Marking Equipment Co. The stamps, called "Rams Head", are made of a high grade tool steel, blued for rust prevention.

The Acme stamps are available in convenient boxed sets, which include a complete alphabet, and figures 0 through 8 (6 is inverted for 9). The sets are furnished in sturdy, wooden cases, partitioned for convenience. Acme stamps are useful for marking parts, tool, and name plates; in re-

verse style, for marking molds, forming dies, die casting and drop forging dies. Each stamp is marked on the front with the character designation,



thus indicating the correct position for stamping. For further information, write:

**Acme Marking Equipment Co.
Dept. BB
8030 Lyndon St.
Detroit 21, Mich.**

STERLING DRILL GRINDER



CAPACITY:

$\frac{3}{8}$ " to 2 $\frac{1}{2}$ " drills.

5" x 9" adjustable table.

MOTOR: $\frac{1}{2}$ hp,
3450 rpm.

NET WT: 250 lbs.

CRATED: 320 lbs.

McDONOUGH MANUFACTURING CO.

EAU CLAIRE, WISCONSIN, U. S. A.

INCREASE YOUR PROFITS WITH A HIGH SPEED



COLD RIVETING HAMMER

GET A FREE
ANALYSIS OF
YOUR RIVETING
PROBLEM...

WRITE TODAY!

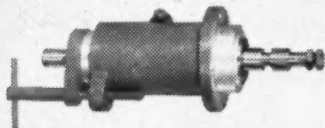
The High Speed Hammer Co., Inc.

311 Norton St.

Rochester 5, N. Y.

MOORADIAN BALL BEARING SHAPER MANDRELS...

Does The Work Of Expensive Shapers!
Easily mounted on any table top



Size of Spindle	1 1/2"	2"	3"	4"
Length overall	11"	12"	14"	18"
Diameter of Quill	1 1/2"	2"	2 1/4"	3"
Dist. of Quill travel	2 3/4"	2 3/4"	3"	3 1/2"
Capacity for blades	2 3/4"	2 3/4"	3"	3 1/2"
Weight each	3 1/2 lb	4 1/2 lb	8 lb	14 lb
List Price each	\$30.00	\$35.00	\$40.00	\$50.00

- Positive quill locks spindle securely.
- Equipped with two jam nuts for positive blade lock.

MOORADIAN MANDRELS America's Finest

- Ball Bearings
- Adjustable for precision work
- Precision machined collars
- Equipped with Zerk fittings
- Precision machined spindles
- Finish: polished aluminum



Diam.	Spindle Length	Wght. Lbs.	List Price Each
3/4"	7"	1 1/2	\$ 7.00
1"	10 1/2"	3	8.00
1 1/4"	12 1/2"	3 3/4	9.00
1 1/2"	12 1/2"	4 1/4	11.60
1 3/4"	18"	9	20.40

All prices are f.o.b. Los Angeles, California, and subject to change without notice.

Jobbers, Write For Prices

Mooradian Manufacturing Co.
323 East 58th St., Los Angeles 11, Calif.

NEW DRILLING FIXTURE HAS WIDE VERSATILITY

The Universal Part Holder, introduced by Mueller Industries, Chicago, is a fixture for drilling, tapping, threading, counterboring and similar operations, which can be operated either manually, automatically, by mechanical means, or by attaching to an air line.

Through the use of a self-centering principle, the Universal Part Holder provides for accurate, fast production. This clamping method assuring precise centering, is adjustable for location and pressure. The clamping jaws have a maximum opening of 3/16", permitting a part to be held behind a shoulder. The part holder features simplicity and speed in set up; it will accept work up to 1" round or hex, and irregular shaped pieces within that range. Drill sizes up to 1/2" can be used, and it can accept, interchangeably,



standard A. S. A. drill bushings. The height of the bushing from the work is adjustable, to allow for adequate chip clearance and sufficient coolant entry.

Manual operation is done by using the hold lever; the mechanical method, by adding a connection rod to the unit;

for pneumatic operation, a plunger, air plug, and air hose are connected. For complete details, write:

Mueller Industries, Dept. BB
4755 N. Rockwell St.
Chicago 25, Ill.

RUSTLESS VERNIER CALIPER **ACCURATE TO .000008"**

The George Scherr Company announces the manufacture in Switzerland, under its trade name, of a Rustless Chrome Vernier Caliper which enables the mechanic and toolmaker to measure from 0-6" in 1/1000" and 1/64" for outside, inside and depth dimensions.

The tool is provided with knife edges for measuring the root diameter of threads and with points for accurate dividing. All parts are manufactured to close tolerances with the result that the sliding action is extremely smooth when the vernier is moved along the scale. The blade and jaws are hardened throughout. The blade of an ordinary Vernier Caliper soon de-

velops wear and is easily damaged; in the Scherr Vernier Caliper, this has been overcome by making the slide of rustless chrome and of such a degree of hardness in comparison with the bar, that the wear between the two



members is virtually negligible making for extremely long life. The jaws have an optically lapped finish, and when checked with optical flats, show that the measuring surfaces are accurate to eight millionths of an inch. The jaws are guaranteed to be parallel.

The George Scherr Co., Dept. BB
200 Lafayette St.
New York 12, N. Y.

UNEQUALLED ACCURACY with **ERICKSON Holding Tools** **No Other Collet or Chuck can give you** **these 7** **BIG** **FEATURES**

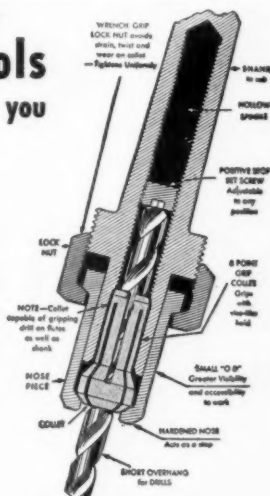
1. Guaranteed accuracy of .0005".
2. Collet collapses over a range of 1/32", replacing seven standard single-purpose collets.
3. Drills gripped on flutes; permits stubbing and use of broken drills.
4. Greater feeds and speeds.
5. Longer tool life.
6. Less set-up time.
7. Grips tighter, as gripping surface extends along entire collet length.

Erickson precision features are adapted in Erickson air-operated chucks, adjustable holders, top chucks, air-operated expanding mandrels, speed indexers, wheel dressers, gage vises, and Erickson-State boring bars.



Ask for Catalog "T-4"

ERICKSON TOOLS DIVISION
2310 Hamilton Ave., Cleveland 14, Ohio



Patent Nos. 2228685, 2358299,
2358300, 2383036
and pats. pending

NEW TOOL SET REDUCES WORK HANDLING TIME

A new combination tool set, produced by the Davis Boring Tool Div., of Giddings & Lewis Machine Tool Co., is designed to eliminate trips to the tool room for boring tools and set-up accessories.

The convenience of having various size super micrometer fly cutter tools, an offset boring and facing head, jacks, parallels and adaptors immediately available in a single set saves valuable man hours. Through its use, the machine operator does not lose time in selecting the right size boring tool for a fly cut, or in searching for needed work holding accessories to make a setup.

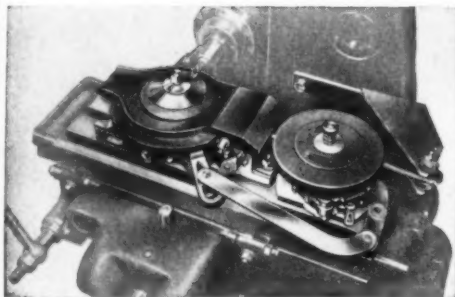
This tool assembly is the result of carefully studied needs common to many machining jobs and is especially useful on horizontal and vertical boring machines. In a typical set, there are seven different sized super micrometer boring tools that have an infinite cutting range in diameters from $1\frac{1}{4}$ " to 7". For boring both larger and

smaller holes, there is a micrometer graduated boring and facing head with a working range from 0 to 13". This



head is equipped with different type cutters which can be mounted in the tool slide either parallel to or at right angles to the tool shank.

Maximum Production . . . in Chucking and Indexing



With the new **Dearborn Automatic Indexer** connected to a **Dearborn Chucking Fixture**: chuck is closed **automatically**; indexed the required number of times **automatically**; chuck is opened **automatically**; piece is knocked out **automatically**.

When used with the **Dearborn Degree Indexing Fixture** it can quickly be set to index any number of degrees from 30° to 90° at one indexing and then knock out, or it can be set to index from no degrees to 90° and then not knock out.

WRITE FOR FURTHER INFORMATION

J. W. DEARBORN

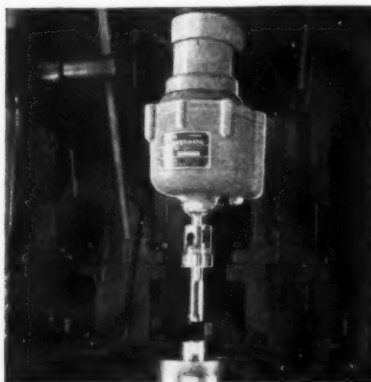
ANSONIA, CONN.

Setup accessories have also been chosen to speed mounting the work. Readily available for immediate use, are four precision hardened and ground parallel blocks, four adjustable stop jacks and four hardened and ground stop and jack blocks. For complete details and specifications, write:

Davis Boring Tool Div., Dept. BB
Giddings & Lewis Machine Tool Co.
Fond du Lac, Wis.

TORQOMATIC TAPS CHROME STEEL AT FINGER-TIP PRESSURE

The Charles L. Jarvis Co., announces the new Torqomatic torque driven tapper, displayed at the recent A.S.T.E. Show in Cleveland The Torqomatic introduces a new principle in tapping attachments. The torque driven tapper is said to meet the need for a universally adaptable power tool. Available in three sizes, the Torqomatic is ultra-sensitive, and taps all types of materials from soap to copper or chrome



steel without appreciable increase of finger-tip pressure required to operate an ordinary drill press. The new device, can be furnished to fit any drill press or tapping machine. Descriptive literature is available upon request to:

The Charles L. Jarvis Co., Dept. BB,
Middletown, Conn.



New Model 70

Multi-Wheel Num- bering Machine

Machine and Shank
All One Piece.

The most efficient method of stamping numbers into metal. Repeats the same numbers until changed. Model 70 NUMBERALL Machines are used in all industries to mark various parts. Stamps numbers, etc., quickly . . . neatly. Perfectly aligned. Much better marks are produced by these machines than by single stamps or steel type, and at a far lower cost. Shank for Hand or Press and with any number of wheels from 3 to 20.

Write for
Bulletin BB-70.



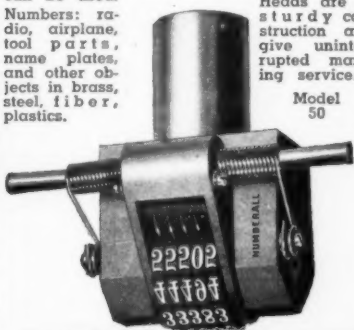
AUTOMATIC INDENTING NUMBERING HEAD • MODEL 50

Automatic indenting numbering head for consecutive or repeat numbering 1/32" to 3/16" high figures can be furnished in sharp face Gothic or shaded Roman figures. Prefix or suffix letter wheels. Bench, foot, or power presses can be used.

Numbers: radio, airplane, tool parts, name plates, and other objects in brass, steel, fiber, plastics.

Heads are of sturdy construction and give uninterrupted marking service.

Model
50



NUMBERALL STAMP & TOOL CO.
HUGUENOT PARK STATEN ISLAND 12, N. Y.

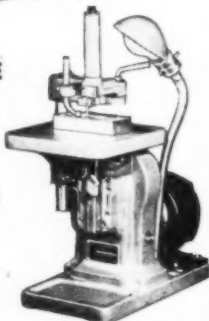
NEW MODELS
Low Prices!
\$49.50 Buys this No. 2-SK

**ANGLEMASTER
SINE VISE**



**RETRACTABLE
No. 9-A
DIE MAKING
MACHINE
for
\$148.00**

*The most
complete
machine of
its kind.*

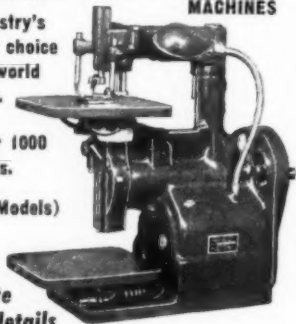


**DUPLEX PUNCH & DIE MAKING
MACHINES**

Industry's
first choice
the world
over.

Over 1000
Users.

(3 Models)



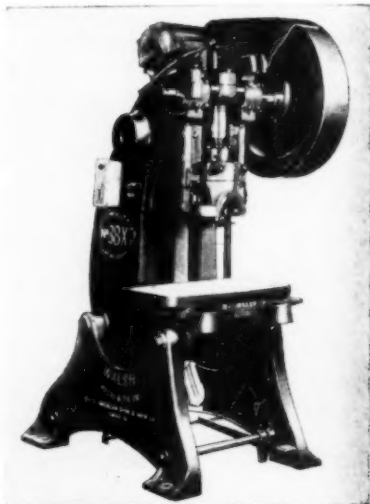
**Write
for details**

IDEAL TOOL AND DIE CO., INC.
733-35 Congress St., Schenectady 3, N.Y.

**PRODUCTION AND TOOL ROOM
PUNCH PRESS**

A 38-ton capacity, open back, inclinable punch press, Model 38X, is announced by Walsh Press & Die Co. This new unit is equipped with a variable speed drive, and is useful either as a tool-room and test-run press, or as a production machine.

Its uses include shearing-in of dies and punches; used for die try outs in place of a screw press, the Walsh 38X is said to give an exact indication of results on the production run. The slow motion of the screw press can result in a perfect sample, when the metal will actually crack on a punch press, using the same die, because of the high speed at which the metal has to be formed. The 38X shows up this material failure from the start.



The press has a 17" distance between gibs, a bed area of 18" x 26", and a throat depth of 12"; it can be furnished with up to a 6" stroke in either a fly-wheel or back-geared type, and with either a variable speed or conventional

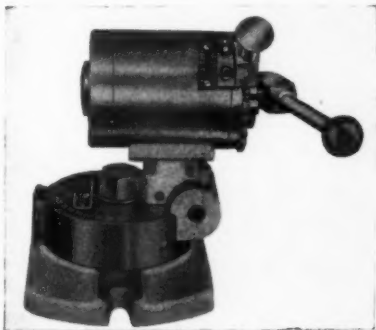
drive. For complete information, write:
**Walsh Press & Die Co., Div. of
 American Gage & Machine Co.**
 Dept. BB, 4709 W. Kinzie St.
 Chicago 44, Ill.

MATCO UNIVERSAL DIVIDING COLLET HEAD

The Matco universal dividing collet head, used for precision milling and grinding angles, flats, tapers, hexagons and keyways, has added two new features that increase the adaptability of this production fixture; one is the tail stock attachment for added advantages in centering work; the other is the lever action collet closer, making the collet head a greater production tool with rapid opening and closing.

Other attachments available with this device include radius and angle wheel dressing, sharpening end mills and milling cutters, for use on cylindrical grinders for collet work. The Matco collet head takes up to 1" capacity in 5C ground thread collets. Its features include a sturdy graduated

base, precision ball and thrust bearings, hardened and ground spindle and 24-tooth index plate, hardened and



ground within .0005 spacing. Standing 6½" high, the collet head weighs 21 lbs.

Matco Tool Co., Dept. BB
 2834 W. Lake St.
 Chicago 12, Ill.



**Patented
 Expanding
 Internal
 Comparator**



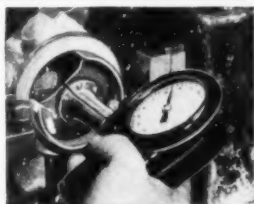
with interchangeable expansion plugs for holes from ¼" to 8"

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 FULLY ILLUSTRATED
 BULLETIN 33**

precision holes in quantity, by all means investigate Comtorplug.

**"In gaging precision holes, from machine
 to inspection, we find Comtorplugs best
 combine accuracy with ruggedness."**

With the same interchangeable amplifier fitting expansion plugs from ¼" to 8" dia., Comtorplug provides a gage of "Shop ruggedness with laboratory accuracy." Automatic features of self-centering and self-alignment assure positive accuracy in gaging bores to readings within a fraction of .0001". Not a passing reading. Actual size of hole is shown on dial. Automatic 2-point contact. Shows actual diameter, and detects front or back taper, out-of-round, bell mouth, barrel shape, etc. Gages the work while still in the chuck. Different operators always get the same reading. If you produce



MACHINE OPERATOR



INSPECTOR

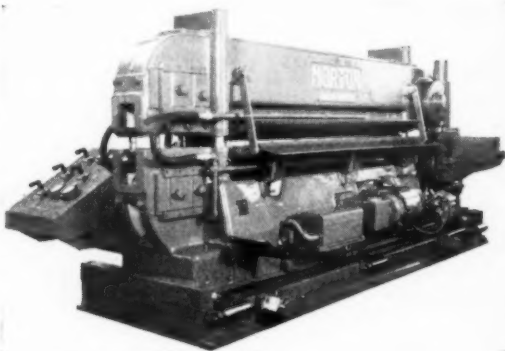
Other Comtor Products:
 "COMTORGAGE," Precision External
 Comparator: Bulletin 30
 COMTOR SURFACE SMOOTHNESS
 COMPARATOR: Bulletin 32A

COMTOR CO.
 62 RUMFORD AVE. WALTHAM, MASS.

When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK

MORTON ROLLING MILL FLASH TRIMMER

This new Morton Heavy Duty Rolling Mill Flash Trimmer is designed for use in a continuous process rolling or pickling line. Coils of steel are joined together by electric welding to form a continuous strip which can be passed at a constant rate through the pickling and washing process for scale removal. It is then recoiled into double or triple length coils for reducing loss and cost in the cold finishing processes



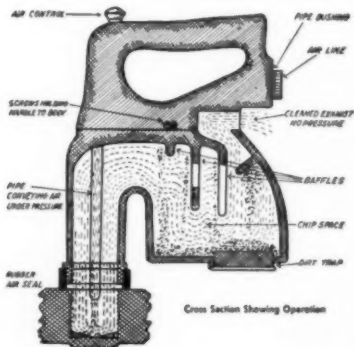
In the welding process, the push up or forging process creates an upset at the welded joint which must be removed before passing through the cold reducing mills. The Morton Flash Trimmer is placed in the

line adjacent to the Flash Welder. The welded strip is quickly moved to approximate center of the Trimmer. The Flash Trimmer is provided with power horizontal traverse for final alignment

IT'S HERE!! THE BUFFALO PNEUMATIC CHIP GUN

A NEW METHOD OF REMOVING CHIPS FROM BLIND DRILLED AND TAPPED HOLES.

Eliminate the danger to your workmen from flying chips by removing your cuttings with the BUFFALO PNEUMATIC CHIP GUN. Simply place the nozzle over the hole, release the air by thumb pressure and the cuttings are deposited in the body of the gun.



SAFE!

CLEAN!

EFFICIENT!

Write for Bulletin No. 1011 today

BUFFALO MACHINERY CO., INC.
838 Grant Street Buffalo 13, New York

of the machine with the weld. This type Morton is built in sizes to trim 38" to 120" wide sheets.

The machine is equipped with opposed clamping jaws which are mounted on the lower and upper housings. The upper housing is moved toward or away from the lower housing by power driven eccentrics. Thus since the continuous strip is passed through the machine between the two housings their movement creates the means for clamping on each side of the weld the full width of the sheet.

An automatic cycle of operation speeds production. The operator stops the weld near center of the machine, then causes the upper housing to lower to the clamped position. When clamped, the rams move automatically and simultaneously across the sheet, cutting the flash. At the end of the fixed travel, limit switches start the unclamp and ram return motions. The machine is also returned to its central position of traverse automatically ready for the next weld and trim. For further details, write:

Morton Manufacturing Co., Dept. BB
Muskegon Heights, Mich.

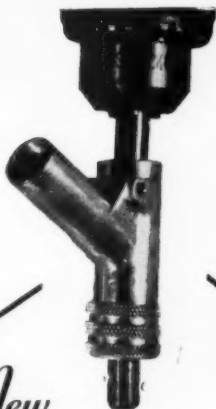
SPE-D-CUT REAMERS PROVIDE HIGH ACCURACY

Wendt-Sonis Co. announces the development of a new line of reamers known as the SPE-D-CUT. Standardization on straight shank styles and size ranges which are widely used has made possible this new economy line.

The new reamer embodies precision qualities such as precision tolerances



(.0005 on the diameter) and diamond lapped cutting edges. It can be used on both ferrous and non-ferrous materials. SPE-D-CUT Reamers are available in 13 different diameters—all in



New *Low Priced* **CENTER SCOPE**

Body Length
2 3/4"

Shank Diameter 3/8"
Length 1"

A new center scope designed to meet today's competitive market—same unquestioned accuracy, same fine workmanship, same high magnification, same simple operation—known as Series "M".

Is lighter in weight than previous models. Use it for all precision locating needs on lathe, drill press, jig borer, vertical boring mill.

Adjustment for line-up to the spindle axis is obtained by turning knurled sleeve at the bottom of the instrument.

Now for the first time a Center Scope for \$24.50.

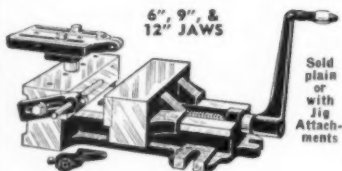
Genuine Morocco Covered Case, \$3.50

- - - - -

CENTER SCOPE PRODUCTS

3829 San Fernando Road
Glendale 4, California

Positions plain or irregular work for duplicate operations



GRAHAM Multi-Purpose Vise

Where a jig or fixture ordinarily would be required, this vise gives a ready-made fixture for all sorts of jobs on planer, miller, shaper, drill press, radial, grinder, etc. With stops, guides, V-jaws, shell jaws and special plates, it serves a thousand uses. Sizes up to 124 lbs.

"Adjust-angle" KNURL HOLDER



Fitting
lathe
turret

Requires only straight knurls to cut many different patterns on work up to 2½" diameter.



Request Illustrated
Price Bulletin 41

GRAHAM MFG. CO.

59 Bridge Street • Providence, R. I.

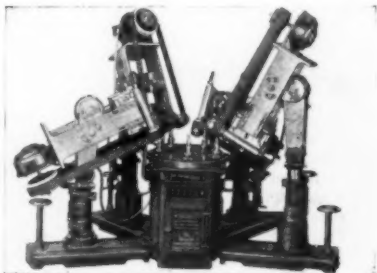
straight shank styles. For taper shank requirements, a standard split sleeve reamer driver is used with the straight shank tool. New catalog sheets, showing full specifications and prices sent on request to:

Wendt-Sonis Co., Dept. BB
Hannibal, Mo.

NEW ABRASIVE BELT HEAD FOR PACKER-MATICS

A special abrasive belt head for automatic polishing and buffing is announced by the Packer Machine Co. The new interchangeable head permits various types of wheel applications as well as the use of abrasive belts.

Standardization of the mounting design makes it adaptable to most types of Packer-Matics now in use. The ability of these machines to handle changes in product design without necessitating any change in equipment in short production runs is thus greatly increased.



The flexibility of the new abrasive belt head permits single operating automatic buffing and polishing of such items as door knobs, cooking utensils and die-castings.

The new head will accommodate the use of buffs, polishing, tampico and wire wheels or an abrasive belt. For complete technical information and specifications, write:

The Packer Machine Co., Dept. BB
Meriden, Conn.

**Monarch Precision
SHAPLANE
Radius Tools**



Patent Pending

For Lathes, Shapers, Planers, Boring
Mills, etc. Min. Rad. $\frac{1}{2}$ " to Max.
Rad. $2\frac{1}{2}$ ". Made in 3 Models.

C. B. TEETER
Machine Specialties
4470 Oakenwald Ave., Chicago 15, Ill.
Phone Drexel 3571

YOST DRILL PRESS VISE



This new Yost vise has been designed expressly for use on drill press operations. Does away with special and costly jig fixtures.

Offered in two sizes.

Vise No.	Width of Jaw, Inches	Opens Inches	Weight Pounds
1D	$3\frac{1}{2}$	$3\frac{1}{2}$	$12\frac{1}{2}$
2D	5	$5\frac{1}{2}$	23

Do you need a vise of ANY type?

*Write today for bulletins on
the extensive Yost line*

YOST MFG. COMPANY
1335 SO. MAIN ST.
MEADVILLE, PENNSYLVANIA



MFD. BY
CATSKILL
METAL
WORKS, INC.
CATSKILL, N.Y.

MODERATELY PRICED

**MECHANIZE Hand Reaming
with the CATSKILL Model R
Power Reaming Machine**

SPEED UP hand reaming to
production line tempo! **SAVE**
time, effort, money!

Compact, plug-in unit. Ideal for
reaming, de-burring, lapping,
chamfering, and special tool ap-
plications. A truly versatile power
tool.

**RANGE of SPEEDS
AVAILABLE**

WRITE FOR FULL DETAILS

SOLD EXCLUSIVELY THROUGH THE
DOALL COMPANY

Desplaines, Ill. Branches in All Principal Cities

EKLIND 6-SPEED MILLING HEAD

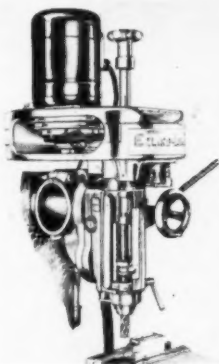
The Eklind High Speed Milling Head features a two-way offset adaptor, consisting of a heavy duty casting bored in two directions. It can be mounted in any position above, below, or at the side of the overarm. This double swivel effect permits a direct vertical adjustment of more than 7" in the position of the head. Combined with the 4" movement of the spindle, this feature allows the operator a wide range of adjustment.

The ball bearing assembly permits closing and opening of collets by the hand knob, without wrenches. The forward-stop-reverse switch and the spindle locking pin are at the front of the machine for convenience.

Other features include six speeds, ranging from 250 to 5300 r.p.m., a micrometer adjusted positive depth stop, a $\frac{1}{2}$ " collet capacity, heavy chrome-plated steel quill, and a heavy steel spindle. The head is arranged for use with a conventional type $\frac{1}{2}$ h.p. elec-

tric motor, or with the new Fairbanks-Morse Axial Air Gap motor.

The manufacture and sales rights of



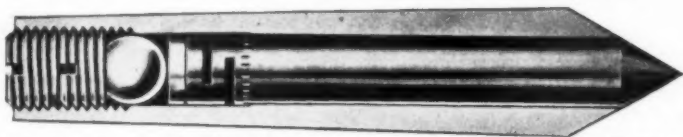
the Eklind High Speed Milling Head have recently been acquired by the Universal High Speed Tool Co. For



REVOLVING TIP

Lathe Center

LOWEST PRICED LIVE CENTER ON THE MARKET \$6.25



You can save minutes and dollars with a center which runs completely cool. It yields under load to compensate for work expansion. EVCO Revolving Tip Lathe Center has the same dimensions as standard solid centers and is made of accurate quality construction throughout.

With the EVCO Revolving Tip Lathe Center you avoid messy lubrication of work centers and avoid damaged center holes in work.

No. 2 Morse Taper Shank	\$6.25
No. 3 Morse Taper Shank	7.75
No. 4 Morse Taper Shank	9.75

ASK YOUR DEALER FOR DETAILS

ERNEST H. VANDERWALL CO.

440 GOLDEN GATE AVE.
SAN FRANCISCO 2, CAL.

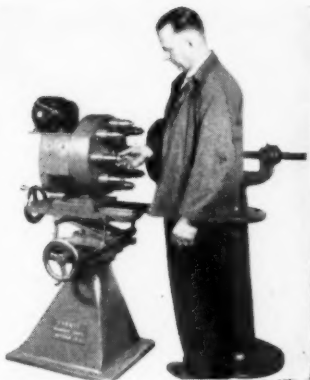
further details, write:

**Universal High Speed Tool Co.,
Dept. BB
549 W. Washington Blvd.
Chicago 6, Ill.**

BUFFER AND POLISHER HANDLES ODD SHAPES

A new electrically powered buffing and polishing machine geared to handle articles of many different shapes and sizes is introduced by the Vanott Machine Corp. The unit, Type V-1, is designed to step up production and lower unit manufacturing costs. It is adaptable to the needs of plants with many different shapes to polish or buff, because it is adjustable for heights, angles, spindle speed, and stroke up to 6".

The chucks are individually designed to hold the item being buffed or polished. All vital mechanism is enclosed to give protection from abrasive wear; a foot pedal revolves the head, allowing the operator the use of both hands.



Production estimates are furnished without obligation by the firm's engineers. Full information may be secured from:

**The Vanott Machine Corp., Dept. BB,
238 Colgate Ave.
Buffalo 20, N. Y.**

Those Small Jobs Go Easier and Faster
with

SYNTRON

Portable

ELECTRIC TOOLS

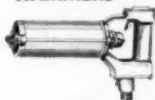
Whatever your job may be

—drilling, cutting and chipping concrete and masonry—drilling, sanding, buffing and polishing wood and metal—grinding welds, wire brush work, snagging castings—

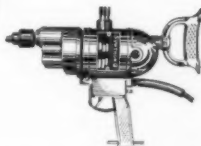
SYNTRON has a modern, efficient tool to do it and do it quickly—write for literature.

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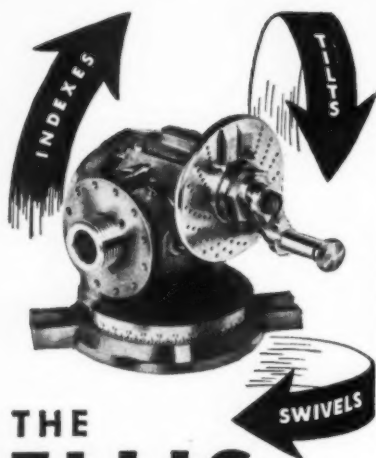
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ELECTRIC DRILLS



GRINDERS and SANDERS



THE ELLIS DIVIDING HEAD

Many unique features make the ELLIS Dividing Head more than an ordinary indexing fixture. It is a precise, rugged unit with 6½" normal swing increased to 11" swing through the use of riser blocks. It TILTS more than 100 degrees in the vertical plane—SWIVELS 360 degrees in the horizontal plane—INDEXES by crank, or directly by hand. Work is held between centers, or in chucks or collets. The ELLIS Dividing Head is a universal work head that will increase the production versatility of your milling machines, grinders, drill presses and jig borers—write for complete details today.

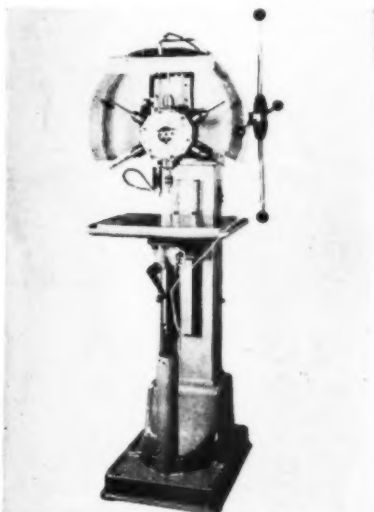
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CORPORATION**

42-A CHURCH STREET,
NEW YORK 7, N.Y.

"BURGMASTER" PROVIDES SIX SPINDLE OPERATIONS AT ONE SET-UP

The new "Burgmaster" Automatic Indexing Six-Spindle Drilling & Tapping Machine might be described as an example of modern magic. Six different operations, such as drilling, reaming, tapping, counterboring, countersinking, spotfacing, recessing, etc., can be performed without moving the work piece from the machine table. Each tool is brought into operating position by a short movement of the feed handles; since each spindle has its own individually set depth stops which index automatically, the operation of the "Burgmaster" is comparatively simple.

Features include a 4½" spindle stroke; ½" drill and ⅜" tap capacity



in steel, to the center of an 18½" dia. circle; six spindle speeds at one setting, ranging from 2600 to 365 r.p.m., all pre-selective, providing the proper spindle speed for each tool as it indexes into operating position; a built-in coolant system and light; work table

provided with $\frac{1}{2}$ " T slots, and a 14" x 18" work surface.

All machines are precision made, and are subject to rigid inspection and test to assure long, trouble-free operation. For literature and free production estimates, submit blue prints and sample piece to:

Burg Tool Mfg. Co., Dept. BB
5028 W. Jefferson Blvd.
Los Angeles 16, Calif.

SHOPCRAFT PILLOW BLOCKS AND ACCESSORIES

A new line of Shopcraft Pillow Blocks and Power Accessories is announced by O. F. DeCastro and Associates. The Pillow Blocks consist of a heavy split cap, bolted in position with $\frac{5}{16}$ " cap screws; a spring-top oil cup is fitted to the bearing cup, providing an oil reservoir for bearing lubrication. Split bearings are cast separately, and are furnished as replaceable inserts in both Zamac metal and bronze. The pil-

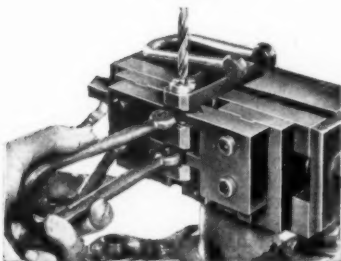
low blocks are all uniform in size, with bearing inserts available in bore diameters of $\frac{1}{2}$ ", $\frac{5}{8}$ ", $\frac{3}{4}$ ", and 1". Shaft diameters may thus be quickly altered simply by changing inserts, without disturbing the location of the housing.



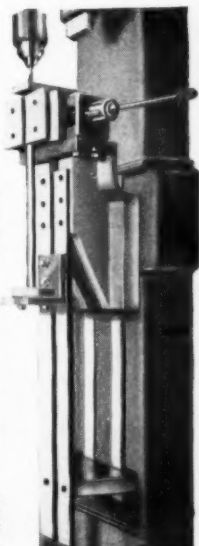
O. F. DeCastro & Assoc., Dept. BB
674 W. Washington Blvd.
Los Angeles 15, Calif.

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**SAVES $\frac{1}{2}$ TOOLING
COST**



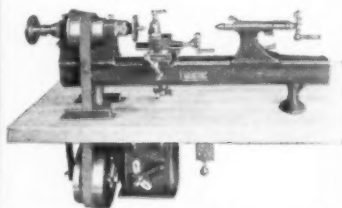
- The only SELF-CENTERING PRODUCTION TOOL for Drill Press or Tapping Machine.
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Chicago 22, Illinois



Integral Drive Precision Bench Lathes. Double-taper headstock bearings of highest accuracy, or best precision pre-loaded ball bearings. Two good sizes $\frac{3}{4}$ " and 1". 30 Precision attachments available.



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Stark Precision Bench Milling Machine.

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"ELECTROBLAST" High Speed Muffle Furnace. Two excellent small sizes.

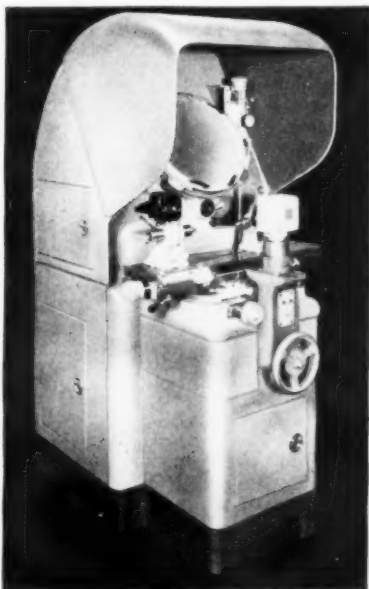
Stark Tool Company

WALTHAM · MASSACHUSETTS
ESTABLISHED · 1862

Originators of the American Bench Lathe

HIGH MAGNIFICATION J&L COMPARATOR

Among recent developments by Jones & Lamson is the new heavy duty pedestal comparator, model PET-14, with a 14" diameter screen and a power elevated table; the hardened and ground table is 30" long and operates on balls in hardened "V" inserts in the bed. The table assembly is supported on an "A" frame construction securely fastened to a 4" diameter column, supported and guided in two preloaded reciprocating ball bearings. The column is adjusted vertically, by means of a 10 pitch elevating screw, either power or hand operated.



Vertical measurements are made by means of a sliding head, equipped with a .0001" indicator attached to the slide support and a .0001" micrometer attached to the table support. An anvil rod engages the micrometer anvil, end measuring bars, or gauge blocks. Measurements up to 1" can be made

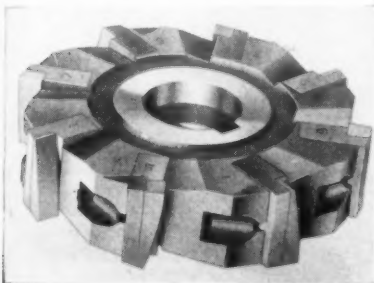
with the micrometer. Gauge blocks or end measuring bars are used for measurements over 1" up to 4". Objects up to 8" diameter and 20" long between centers can be inspected at magnifications ranging from 10 to 100. For complete information, write:

**Jones & Lamson Machine Co.,
Dept. BB
Springfield, Vt.**

CARBIDE TIPPED CURVED TOOTH MILLING CUTTERS

Aber Engineering Works announce a new development in their line of curved tooth milling cutters—the addition of a carbide tipped model.

The new cutter combines the Aber curved tooth design with the metal-removing characteristics of carbide. The cutter body, of special analysis steel, is provided with a locking screw which holds the carbide blade rigidly to the cutter body, eliminating tipping or side motion. The curved tooth shearing action counteracts the inherent brittleness of carbide and reduces the amount of horsepower required for machining operations. The cutters over 1" wide come equipped with inserted carbide



blades; those under 1" wide have brazed-in carbide blades. For specifications and sizes, write:

**Aber Engineering Works, Inc.
Dept. BB
Waterford, Wis.**

ROGERS **FACE GRINDER**



**Electronic
Adjustable Speed
Gives QUICK—POSITIVE**

Control over Table Traverse

The only grinder of its kind with this remarkable electronic speed control device. Designed for high, steady production, faster and more accurate work on iron and steel parts.

SPEED CONTROL DIAL

conveniently located on front of machine can be preset for any speed from 10 to 70 ft. per min. Motor comes to pre-set speed, **smoothly . . . quickly.** Speed can be changed any time while machine is running by turning speed adjusting knob. Not only provides right speed but holds it even when load increased. Reversals are quiet—**vibrationless!**



Capacity up to 12" high, 16" wide, 72" long. 10 H.P. motor. 20" disc wheel. For full information write for Bulletin 320.

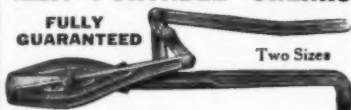
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Grinding Machinery Since 1887**

**SAMUEL C. ROGERS
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BEND****NEW ADJUSTABLE
COLLET BUSHING CHUCK—**

provides an accurate method for mounting centerless armature shafts and similar parts in a lathe. Use in either head or tail spindle. The brass collets are adjustable for running or driving fits. Chucks supplied with 3 collets; 9/16", 5/8", and .637" capacity. Extra round collets, 1/4" to 1" by 16ths, \$1.00 each. **Chuck with No. 2 shank \$8.95**
Chuck with No. 3 shank \$9.45

**SOUTH BEND LATHE WORKS**426A E. Madison St.
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ALLOY PORTABLE SHEARS****FULLY
GUARANTEED**

Two Sizes

No. 1 cuts up to No. 11 gauge strip or sheet.

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A. S. A. STANDARD
Immediate Delivery
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Fast service on specials

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ANTI-FRICTION COMPOUND**SERVING INDUSTRY FOR 34 YEARS**

Cools hot bearings • Solves toughest lubricating problems • Saves wear on moving parts • Works wonders with cutting oils • Packed in 5-10-25-50-100 lb. containers. Write for Free Sample.

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Our service on small gears, due to new equipment recently installed, will interest you. Send samples or blueprints for quotation.

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For "A" section V-belts—3.3—1 speed range—perfect belt alignment in all positions. Priced so low that no shop or machine need go without infinite speed selection. See your dealer or write: **\$16.50**
(3 Types—8 sizes to choose from)

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LABORATORY GRADED PURE DIAMOND POWDERS

For GAUGES, TOOLS, DIES, etc., with tremendous TIME SAVING. These factors make STAR DUST indispensable in lapping and superfinishing on HARDSTEELS, TUNGSTEN CARBIDE, CHROME.

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STAR DUST speeds up production enormously and produces finishes and superfinishes down to less than .0000004 of an inch.

**Precision LAPPING
POWDERS for
PRECISION work**



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ONE SPRUCE STREET
NEW YORK 7, N. Y.

NEW TRIPLE-FLUTE END MILL

Cadillac Cutter Co. has introduced a new line of standard double end mills made with 3 cutting edges instead of the conventional 2 and 4-flute. The 3-lip mill is claimed to possess many operational advantages. It is said to be able to hog metal as fast as the 2-flute



and leave the finish of the 4-flute. It cuts with a shearing action like the 4-flute but without chatter. With the added chip room it will cut faster and run cooler. For die or mold work the operator can use one tool for both hogging and finishing.

This mill is made with heavy web construction, giving it greater strength with less chance of breakage. The insides of the flutes are ground to a high finish. Hook rake angles are designed to give maximum shearing action. Clearance angles will give the greatest cutting efficiency in the toughest steels.

The tool is made without the common center hole in the end which allows milling straight down in the work before starting the cut.

Perfect concentricity is guaranteed, as all manufacturing operations are performed while the mill is held by its outer diameter, in the same manner as it is to be used in actual operation.

Catalog and complete information are available upon request to:

Cadillac Cutter Co., Dept. BB
1613 Eastern Ave. S. E.
Grand Rapids 7, Mich.



A LARGE REWARD IN SAVINGS
for the TOOL & DIE Shop
USING

Pre-GROUND FLAT STOCK

Production Surface Grinding

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LISLE, ILLINOIS

AUTOMATIC LATHE TURNING

(Not Screw Machines)

CENTER & CHUCK WORK—on 8" and 12" DIA. FAY AUTOMATIC LATHES—CASTINGS—SHAFTS—PISTONS—CRANKS, ETC. — 100-1,000,000 pieces

ACE ENGINEERING & MACHINE CO. INC.

3644 N. Lawrence St.

K. R. Fay, Pres.

Philadelphia 40, Pa.

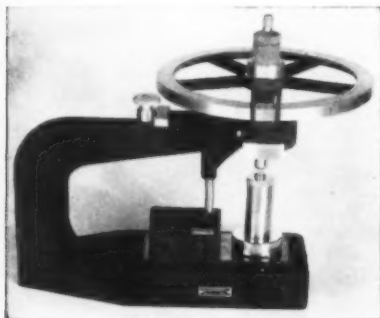
MICROMETER GIVES MEASUREMENTS ACCURATE TO .00001"

The Van Keuren Co., announces a new 0-3" Light Wave Micrometer. Among the improvements in this instrument are a specially designed 1/2" diameter—40 threads per inch, heavy-

which reads to .00001"; an enclosed light wave pressure indicator; an index lock, a non parallax glassindex, larger diameter spacer blocks, a heavier sub anvil, removable and self aligning carboly anvil and spindle contacts and a much heavier and sturdier frame.

The 0-3" micrometer represents an advanced design of measuring instrument, having the fundamental principles of the original light wave micrometer which was developed in 1932. These fundamentals include an extremely sensitive light wave indicator which accurately records the exact pressure of measurement and which makes possible duplication of reading within a few millionths of an inch. The 0-3" Light Wave Micrometer, with its calibration chart showing the accuracy of the screw, will give measurements accurate to .00001" without gage blocks or other reference standards. For additional data, write:

The Van Keuren Co., Dept. BB
176 Waltham St.
Watertown, Mass.



duty, precision micrometer head; an 8" diameter micrometer wheel with .0001" graduations; a Vernier index

Producers of Screw Machine Products to Specifications

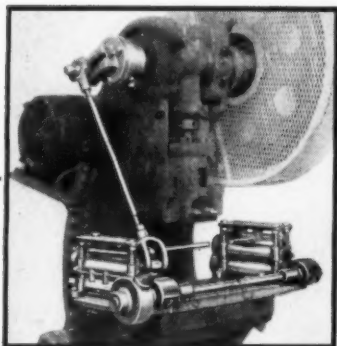
ONE, FOUR and SIX spindle automatics maximum capacity 2 1/2" round. Hand Screw Machines and Universal Turret Lathes maximum capacity 3" round. Castings and Forgings machined maximum 10" diameter, 8" length, 15 pound weight. Secondary operation equipment for milling, drilling, tapping and assembling. Fabricators of aluminum, brass, steel and their alloys.

SCREW MACHINE SPECIALTY CO.

5600 Butler St., Pittsburgh 1, Pa.

Increase the efficiency of your punch presses

with Automatic Roll Feeds



- Easily attached to any press.
- Completely automatic in operation.
- Presses produce 100% of operating time.
- Precision built for consistent and accurate feeding and long life.
- Simple design — easy to maintain.

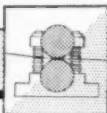
Standard models from 3" to 12" wide with up to 18" advance in both single and double feed models. Larger feeds and longer advances can be made to your specifications.

We also manufacture a complete line of Stock Reels, Stock Straighteners, Wire Straighteners and Scrap Cutters.

Write to-day for literature and quotation forms.
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Joint may be fitted to specification, or with —



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square hole



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Fitted to exact specification at a guaranteed saving per unit.

- Short stubby jaws for maximum strength and economy of space
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- Sacs over 11 1/2" O.D. have grease reservoir, an Atlas exclusive
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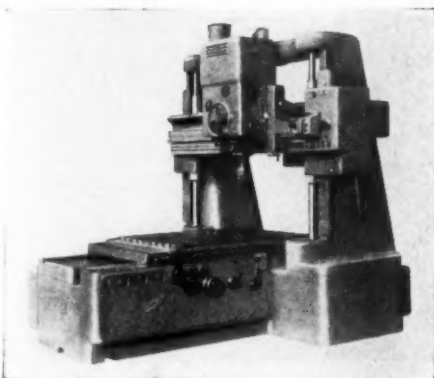
Dept. H 351-9, LABREA, LOS ANGELES, CALIF.

S.I.P. JIG-BORING AND MILLING MACHINE

In response to the demand for a jig-boring and milling machine of larger capacity than any previously available, the Cosa Corporation, American representative of the Swiss manufacturers, Société Genevois d'Instruments de Physique, have recently introduced in this country, the S.I.P. Jig Boring and Milling Machine, Type Hydroptic-7. This machine has a table working surface of $61\frac{1}{2}" \times 40\frac{1}{2}"$. The guaranteed accuracy for all table settings is .0002". The Hydroptic-7 is provided with an optical measuring system, built into the machine, consisting of standard scales which are read by means of micrometer microscopes. Despite heavy mechanical stresses, permanent accuracy is assured, according to Cosa.

The main features of the Hydroptic-7 include a wide range of 18 spindle speeds of from 40 to 2000 r.p.m., and eight automatic milling feeds from 0.0005" to 0.012". The machine is equipped with multiple remote controls.

The working range includes a nominal table travel of 55", a spindle head travel of 40"; the space between the uprights is 63"; maximum distance between the table top and the spindle



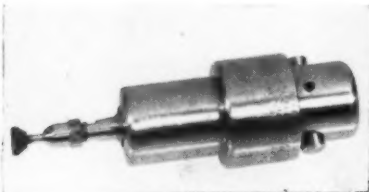
end is 38". The permissible load which the large work table will sustain is 4500 lbs.

The unit has a drilling capacity of $2\frac{3}{8}"$ in cast iron, a spindle quill travel of 12". Complete specifications on the Hydroptic-7 will be sent upon request to:

Cosa Corp., Dept. BB
405 Lexington Ave.
New York 17, N. Y.

MERCURY AIR GRINDER OPERATES AT 55,000 R.P.M.

A new precision tool, the "Mercury" Air Grinder, distributed by the Master



Pneumatic Supply Co., has a wide variety of applications in the metal-work-

ing field. It is built on an entirely new design; the turbine type rotor is an aluminum forging which reduces the gyroscopic effect—always a prevalent headache in tools of this type—to a minimum. The grinder contains no blades nor cylinders to wear out; the only wearing parts are the bearings, which are run in oil in an enclosed housing, around which the air is directed.

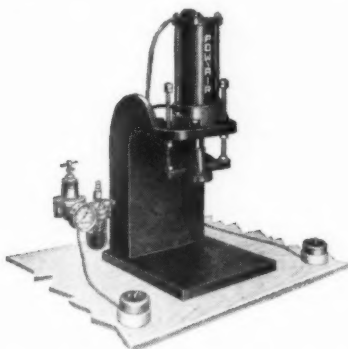
The "Mercury" operates at 55,000 r.p.m., and has the power to maintain speed for real cutting with small mounted stones and rotary files. The length is $4\frac{7}{8}"$; weight is 15 oz. The

compact design enables the tool to be used in tight quarters. Used with a tool post holder, the device is applicable for the internal grinding of small holes. The maximum wheel size is $\frac{1}{2}$ "; carbide cutters of $\frac{1}{4}$ " and less are suggested. For complete details, write:

Master Pneumatic Supply Co., Dept BB
2577 W. Grand Blvd.
Detroit 8, Mich.

PORTABLE PNEUMATIC PRESS HAS 1500-LB. CAPACITY

The new Pow-Air portable pneumatic press, product of James Industries, Inc., is designed to supplant or replace large units on light forming, stamping, riveting, etc. Its capacity is adjustable up to 1500 lbs. The unit measures 25" high x 12" wide, x 16" deep. Speed up to 60 strokes per minute at maximum air pressure of 125 lbs. is attained. The press uses all or any part of its 6" stroke, with constant pressure throughout.



The die space measures 9" x 12", with a 9" open height. The press is equipped with a 4-way solenoid air valve, with dual safety hand switches. Pedal switches and other controls are also available. For details, write:

James Industries, Inc., Dept. BB
331 Municipal Bldg.,
Skaneateles, N. Y.

ARTUS ARBOR SPACERS

The **COLOR** tells the **THICKNESS**

ARTUS Arbor Spacers made of plastic in various colors identify thickness at a glance! .001, .0015, .002, .003, .005, .0075, .010-.030. Speed up accurate fitting at low cost. Write for folder.



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Handy Spacer Assortment

10 ea.	.001 — .0125 thick
5 ea.	.015 — .030 thick
100 SPACERS IN ALL	
$\frac{7}{8}$ " — \$3.10	$1\frac{1}{4}$ " — \$3.80
1" — 3.35	$1\frac{1}{2}$ " — 4.70

Other standard sizes also available.

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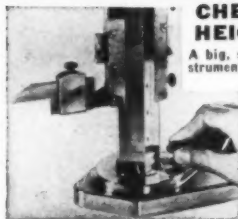
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A big, sturdy stabilized instrument which can double the output of your skilled tool-makers. Fine adjustment by screw operated from knurled nut on base eliminates all rocking or shifting instrument while measuring. Finger pressure on two lugs frees

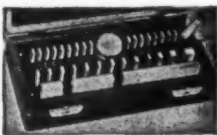
split nut for rapid up or down adjustment. 2½" long vernier in place of the normal ½" vernier gives greater visibility without the need of magnifier or removing gage from work. Both English and metric readings on column. Made in sizes from 12" to 48"—capacities sufficient for the most unusual measurements.

OPTI-FLAT GLASS SURFACE PLATE



Here is the basis for vertical measuring accuracy — an optically ground glass surface, flat within 50 millionths over the total area. A solid, non-warping thick disc of Pyrex brand glass, set in a heavy wood base with dust-proof cover. Immune to the internal strains which may affect the accuracy of metal surface plates, with the added advantage that accidental scratches cannot cause raised burrs, nor usage wear the hard surface. For real accuracy in layout work and critical inspection. Two sizes—12" diam., 2" thick \$58, and 16" diam., 3" thick \$88. Also a complete stock of hand-scraped metal surface plates, angle irons, measuring irons, etc.

ULTRA-CHEX GAGE BLOCKS



Sets in size for all budgets. All blocks accurate to five millionths. Illustrated is the 34-block set, giving 80,000 combinations in steps of 1/10,000", with optical flat for checking wear. Low prices allow for constant practical shop use in setting tools, checking gages, locating holes in jigs and fixtures, etc. Many shops use a number of sets, with one master set for reference. 9-block set, \$27.50, 34-block set, \$125.

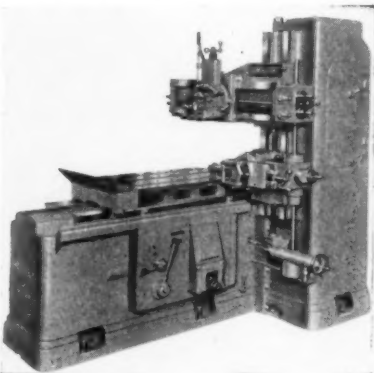
Write for full details on these tools and for the Scherr Small Tool Catalog.

GEO. SCHERR CO., Inc.

198 - Lafayette St. New York 12, N.Y.

NEW ROCKFORD HY-DRAULIC OPENSIDE SHAPER

The redesigned Rockford Hy-Draulic 36" Openside Shaper offers two important new advantages: (1) the range of application is greater due to the new heavier column and rail, and the new redesigned side head; and (2) ease of set-up and operation is improved because of such features as dual controls for table operation from either side of the table. As extra equipment, power rail elevation is available to simplify set-up work further. Safety devices incorporated in the stop and start lever assemblies prevent accidental starting



of the table. Other advantages are provided by the new 36" Openside Shaper, such as fast cutting and return strokes with infinite speed selection between wide range low and high. For complete specifications and technical information on this new unit, write:

Rockford Machine Tool Co., Dept. BB
Rockford, Ill.

PORST EXPANDING ARBOR CUTS PRODUCTION TIME

A new expanding arbor for internal gripping which increases the utility of 1", 1½", and 2" Levermatic Collet Chucks is introduced by Porst Bros. Manufacturing Co. The split arbor is

mounted in the chuck in place of the collet and collet nose, and expanded by the lever; this provides simplicity and ease of operation, plus a rapid and powerful grip. A complete range of expanding arbors is available from 5/16" to 4 5/8" in diameter. The arbors are made in four steps of average length, and of long wearing, heat-treated alloy steel. The operator reduces the arbor to the required size on the machine on which the job is to be run, assuring absolute concentricity.

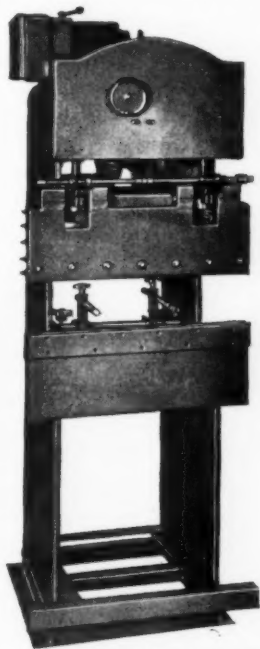
The Levermatic Chuck and Arbor unit is applicable to many operations, such as cylindrical grinding, milling, drilling, surface grinding, and many others. The Levermatic Chuck is mounted on the lathe spindle nose; the chuck rotates, and with the aid of the shifting lever, it operates without stopping the spindle, and without over-



heating. The chuck insures a positive, straight parallel grip on the work, and a steadier hold through the full length of the collet bearing. A manually operated selective collet adjustment ring with self-locking positions maintains a set predetermined pressure, and assures a solid grip for tough steel under heavy cuts, and a firm grasp on thin tubing and plastics. For further details, write:

Port Bros. Mfg., Co., Dept. BB
 259 N. California Ave.
 Chicago 12, Ill.

KNIGHT PRESS BRAKES



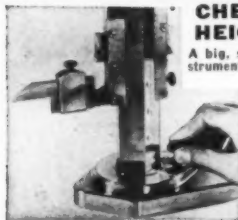
(Model 1024 Illustrated)

NOW AVAILABLE IN
2 - 3 - 4 & 5 FT. MODELS

WRITE FOR DETAILS

KNIGHT MACHINERY CO.
 1005 S. DELAWARE ST.
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SCHERR aids to precision — production



CHESTERMAN HEIGHT GAGE

A big, sturdy stabilized instrument which can double the output of your skilled tool-makers. Fine adjustment by screw operated from knurled nut on base eliminates all rocking or shifting instrument while measuring. Finger pressure on two lugs frees split nut for rapid up or down adjustment. $2\frac{1}{2}$ " long vernier in place of the normal $\frac{1}{4}$ " vernier gives greater visibility without the need of magnifier or removing gage from work. Both English and metric readings on column. Made in sizes from 12" to 48"—capacities sufficient for the most unusual measurements.

OPTI-FLAT GLASS SURFACE PLATE



Here is the basis for vertical measuring accuracy — an optically ground glass surface, flat within 50 millionths over the total area. A solid, non-warping thick disc of Pyrex brand glass, set in a heavy wood base with dust-proof cover. Immune to the internal strains which may affect the accuracy of metal surface plates, with the added advantage that accidental scratches cannot cause raised burrs, nor usage wear the hard surface. For real accuracy in layout work and critical inspection. Two sizes—12" diam., 2" thick \$58, and 16" diam., 3" thick \$88. Also a complete stock of hand-scraped metal surface plates, angle irons, measuring irons, etc.

ULTRA-CHEX GAGE BLOCKS



Sets in size for all budgets. All blocks accurate to five millionths. Illustrated is the 34-block set, giving 80,000 combinations in steps of $1/10,000$ ", with optical flat for checking wear. Low prices allow for constant practical shop use in setting tools, checking gages, locating holes in jigs and fixtures, etc. Many shops use a number of sets, with one master set for reference. 9-block set, \$27.50. 34-block set, \$125.

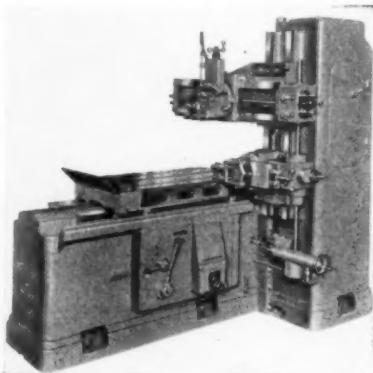
Write for full details on these tools and
for the Scherr Small Tool Catalog.

GEO. SCHERR CO., Inc.

198 - Lafayette St. New York 12, N.Y.

NEW ROCKFORD HY-DRAULIC OPENSIDE SHAPER

The redesigned Rockford Hy-Draulic 36" Openside Shaper offers two important new advantages: (1) the range of application is greater due to the new heavier column and rail, and the new redesigned side head; and (2) ease of set-up and operation is improved because of such features as dual controls for table operation from either side of the table. As extra equipment, power rail elevation is available to simplify set-up work further. Safety devices incorporated in the stop and start lever assemblies prevent accidental starting



of the table. Other advantages are provided by the new 36" Openside Shaper, such as fast cutting and return strokes with infinite speed selection between wide range low and high. For complete specifications and technical information on this new unit, write:

Rockford Machine Tool Co., Dept. BB
Rockford, Ill.

PORST EXPANDING ARBOR CUTS PRODUCTION TIME

A new expanding arbor for internal gripping which increases the utility of 1", $1\frac{1}{2}$ ", and 2" Levermatic Collet Chucks is introduced by Porst Bros. Manufacturing Co. The split arbor is

mounted in the chuck in place of the collet and collet nose, and expanded by the lever; this provides simplicity and ease of operation, plus a rapid and powerful grip. A complete range of expanding arbors is available from 5/16" to 4 5/8" in diameter. The arbors are made in four steps of average length, and of long wearing, heat-treated alloy steel. The operator reduces the arbor to the required size on the machine on which the job is to be run, assuring absolute concentricity.

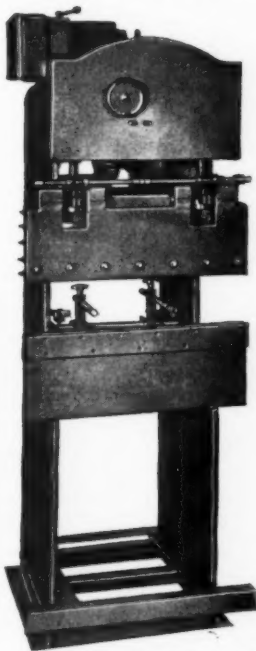
The Levermatic Chuck and Arbor unit is applicable to many operations, such as cylindrical grinding, milling, drilling, surface grinding, and many others. The Levermatic Chuck is mounted on the lathe spindle nose; the chuck rotates, and with the aid of the shifting lever, it operates without stopping the spindle, and without over-



heating. The chuck insures a positive, straight parallel grip on the work, and a steadier hold through the full length of the collet bearing. A manually operated selective collet adjustment ring with self-locking positions maintains a set predetermined pressure, and assures a solid grip for tough steel under heavy cuts, and a firm grasp on thin tubing and plastics. For further details, write:

Porst Bros. Mfg., Co., Dept. BB
 259 N. California Ave.
 Chicago 12, Ill.

KNIGHT PRESS BRAKES



(Model 1024 Illustrated)

NOW AVAILABLE IN
2 - 3 - 4 & 5 FT. MODELS

WRITE FOR DETAILS

KNIGHT MACHINERY CO.
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ABRASIVE CENT-R-LAP TOOL

Saves time, eliminates diamond dressing. Cones changed in seconds. Available in 2 sizes $\frac{1}{8}$ " and $\frac{1}{4}$ " Cent-R-Laps and abrasive Cones.

Write for descriptive literature and prices.

J. R. Reich Manufacturing Co.
45 E. Stroop Rd. Dayton 9, Ohio

NEW PRECISION FEED DEVICE FOR BENCH AND PEDESTAL PRESSES

An ingenious method of precision feed, for either side or rear feeding, which fits any type of press, has recently been introduced by the Roll Feeds Corp. All attachments for installing are furnished with the unit, including an adjustable disc and tie rod. Called the Roll Feed, it is claimed to be non-slippable at any speed or feed, even when immersed in an oil bath. The Roll Feed has four points of contact to safeguard accuracy. By shifting the feed finger spring from one lug to the lug on the opposite side, the unit can be instantly reversed.

The feed is adjustable in thousandths of an inch, assuring precision of stock movement. The Roll Feed will maintain its original setting, regardless of use or wear, since the problem of friction is obviated by the absence of ratchets or pawls to wear down and offset the accuracy of the feed spacing.

The RFC Roll Feed is available in



QUALITY LATHE DOGS

Heavy malleable iron. Tail shaped to fit face plate slot. Standard Dog has square head screw. Safety Dog has headless screw. Prices for either style.

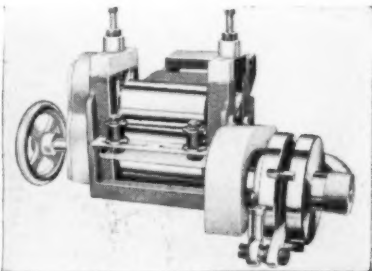


Capacity	Price*	Capacity	Price**
$\frac{1}{8}$ "	\$0.80	$\frac{1}{8}$ "	\$0.70
$\frac{1}{4}$ "	.95	$\frac{1}{4}$ "	.75
$\frac{1}{2}$ "	1.05	$\frac{1}{2}$ "	.90
$\frac{3}{4}$ "	1.20	$\frac{3}{4}$ "	1.00
1"	1.40	1"	1.10
1 1/4"	1.55	1 1/4"	1.35
2"	1.70		
2 1/2"	1.85		
3"	2.20		
3 1/2"	2.00		
4"	4.00		

*13-inch or larger lathes.
**9-inch and 10-inch lathes.

SOUTH BEND LATHE WORKS 426A E. Madison St. South Bend 22, Ind.

seven standard sizes, ranging from a length of feed of $\frac{1}{4}$ ", and width of $\frac{1}{2}$ ", suitable for attachment to 4, 6, 8, and 10-ton bench or pedestal type high-speed power presses (Model A) to sizes



providing 10" length and 10" width of feed (Model G). For details, write:

Roll Feeds Corp., Dept. BB
148 Middle St.
Pawtucket, R. I.



New NESTING TYPE TOTE PANS

20" Long x 12" Wide x $\frac{6}{4}$ " Deep
16 Ga., drag holes, handles both ends.

J. L. LUCAS & SON, INC.
BRIDGEPORT 5, CONN.

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- SAVE TIME
- SAVE OIL
- SAVE WORRY

Eliminate hand oiling. Stop bearing failures. Get maximum machine life. Easily installed ... Get all the facts:

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TRICO FUSE MFG. CO. Milwaukee, Wis.

DERBYSHIRE



Fine Precision Instrument **LATHE**
WIRE CHUCKS

.004" capacity to

MAGNUS-ELECT _____ .315"

D. LARGE _____ .250"

D. WEBSTER-WHITCOMB _____ .196"

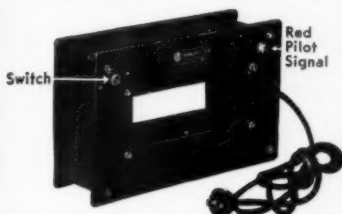
STANDARD ACCURACY

.0002" **ECCENTRICITY**

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Waltham 54, Massachusetts

AMC *Quick* DEMAGNETIZER



A necessity where machine tools are used.

Standard units available and special sizes to order.

Write today for descriptive circular.

ALOFS MFG. CO.

1629 Madison

Grand Rapids, Mich.

SPECIFY

Hall...

PRECISION LEVELS

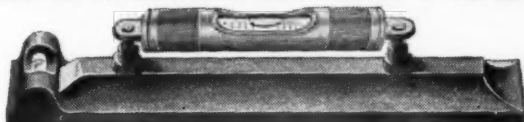


FIG. NO. 5 Adjustable type Machinists' Levels with ground and graduated vial. Grooved for use on shafting. Sizes 4", 6", 8", 12", 18".

"MANUFACTURERS OF
SPECIAL LEVELS
FOR ANY USE."

FIG. NO. 50—For setup and maintenance is accurate to 10 seconds. Graduations are in .0005" per foot. Packed in Instrument Case.

Address Orders or Inquiries to

HALL LEVEL AND MANUFACTURING WORKS

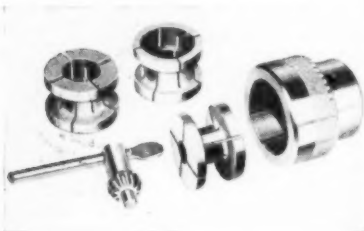
(Established in Geneva, Ohio, in 1913)

1119 E. 4TH

AUSTIN, TEXAS

CHUCK CONSTRUCTION ELIMINATES COLLET DISTORTION

The Martin Collet Chuck is a steel precision tool which is equipped with collets slotted at both ends, allowing equal collapse and gripping power



throughout its length. The construction provides a vise-like grip, without longitudinal play or movement, which eliminates twist and distortion of the collets, and assures accurate alignment of the tools with the work. The firm

grip is accomplished by a single twist of the chuck sleeve.

This chuck is designed for safe operation; there are no projections to catch or injure tools or fingers. Turning may progress right up to the collets without danger.

Martin Chucks are available in two spindle sizes: No. 201, with a 1" arbor hole, and 8 threads per inch; No. 202, with 1½" arbor hole, 8 threads per inch. The chuck with its three double-end collets, can accommodate seven sizes of round stock. By utilizing the full 2" capacity of the chuck without collets, two-inch work can be chucked. The smallest collet will take ½" and ⅝" stock; the second size accepts ¾" and 1" stock; the third collet, 1¼" and 1½" stock. For complete specifications, write:

H. F. Martin, Dept. BB
548 W. Rock Place
Milwaukee 12, Wis.

FREE TRIAL OFFER NO STRINGS ATTACHED



6

LIBERAL JARS
DIFFERENT
GRADES



A VALUABLE KIT

Kit contains 6 grades of ultra-fine quality, assorted fine grit abrasive compounds suitable for a variety of work. Coarser grit compound available.

FOR PRECISION LAPPING

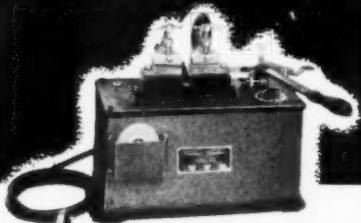
Here's a get-acquainted offer you cannot afford to miss. Among these samples will be found the answer to many a tool room lapping problem. Hard and soft abrasives for all kinds of lapping needs. Sent post paid anywhere in the U.S.A. and Canada. No obligation—write today.

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OFFER LIMITED
Write today

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Weldex Bandsaw Welder



Flash welds blades up to $\frac{3}{4}$ ". Ideal for intermittent wire butt welding applications. Eliminates joint preparation and "special flux". Instantly burns off surface irregularities.

5 weld stations, 1 anneal station, 110 and 220 volt models. For details write

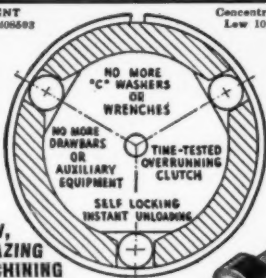
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Detroit 10, Mich.

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No. 2,608,888

Concentricity 10
Low 10,000 lbs



NEW, AMAZING MACHINING TECHNIQUE

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OR INSPECTION



Curtiss-Wright Corporation ranks our product with their best tools. Cleveland Graphite Bronze Company, leading bearing manufacturer, states new high accuracy reached, plus substantial production boosts.

ROUGHLY SKETCH DESIRED MANDREL INTO YOUR
PART PRINT AND FORWARD FOR QUOTES.

YOUNG ARBOR CO. • PH. YE-9784
3257 Bradford Rd., Cleveland Hts. 18, Ohio

HOW TO GRIND CARBIDE CUTTING TOOL BITS ECONOMICALLY



Here's tool grinding at its best!

Employing 3-step progression—rough, semi-finish, and finish or hone—on one machine, this LeMaire 3-Wheel Grinder produces keener edge in fraction of time. Because tools go to diamond wheels in better condition, life of diamond wheels is considerably lengthened. Both labor and wheel costs are reduced—time is saved—production is increased.

Wouldn't you like to know more about this remarkable 3-Wheel Grinder? Send for descriptive folder.

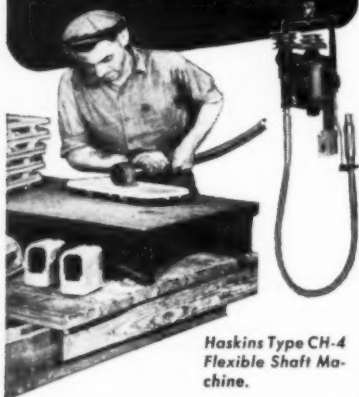
LeMaire Tool & Mfg. Co.

2637 S. Telegraph Road
Dearborn, Michigan

Designers and builders of unit and way type machines for single or multiple spindle drilling, boring, reaming, tapping, etc.—Twin Ram Hydraulic Units—Match-it Gear Chucks.

6 SPEEDS

FOR DIE AND MOLD FINISHING



Haskins Type CH-4
Flexible Shaft Ma-
chine.

Whenever die and mold finishing operations are performed over extended areas—or wherever an overhead unit is needed, versatile Haskins CH-4 Flexible Shaft Machines can speed production. Operating equally well from fixed or trolley suspension, the portable $\frac{1}{2}$ HP air jacket motor, with the Timken countershaft, develops six speeds (as high as 7800 r.p.m.)—can be used with grinding wheels up to 4" diameter.

See what Haskins machines can do for you. Write today for details. **R. G. Haskins, 2645 W. Harrison Street, Chicago 12, Ill.**



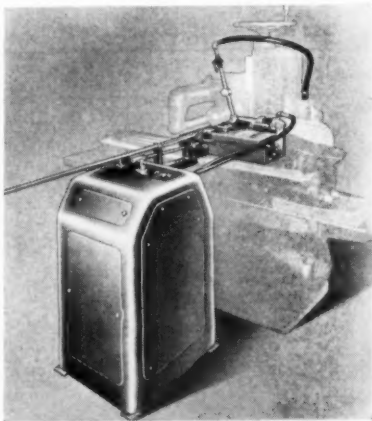
haskins

FLEXIBLE SHAFT EQUIPMENT

BAR STOCK DEVICE SUPPLANTS MANUAL FEEDING

This new feeder, the Pond Projection Operator—200, performs four manual operations automatically; it opens the vise, ejects the finished piece, locates the bar for the next cut, and starts the machine cycle. Operator's duties are reduced to renewing the bar stock. These operations are accomplished by means of an interaction whereby the control unit operates the miller, but the cutting time required by the miller determines the length of the full cycle.

A $\frac{1}{3}$ h.p. electric motor drives the mechanical members, which, in turn, actuate the pneumatic parts; these consist of small air-cylinders which perform essential cycle operations. The feeder is capable of handling round, rectangular, or extruded shapes.



Floor space requires 21" x 21"; a minimum of 70 lbs. air line pressure is required. The length of the cut-off is $2\frac{1}{2}$ " on standard plain millers; on larger type millers, the cut-off is up to 6". Air consumption on a 10-second cycle is $\frac{1}{8}$ c.f.m.

**Production Tool & Die Co., Inc.
572 St. James Ave., Dept. BB
Springfield, Mass.**



The Original **PYRALIN-TIPPED MALLETS WITH
REPLACEABLE BY HAND THREADED TIPS**

Seven different sizes. Takes the place of rawhide, wood, etc. Send one dollar and name of your nearest hardware dealer for post paid sample mallet.

SOUTHWEST MFG. COMPANY

1615 East First Street, Santa Ana, Calif.

U. S. MOTORS DOUBLES MILFORD PLANT

The largest expansion in the history of U. S. Electrical Motors, Inc., is taking shape in Milford, Connecticut, where the company's Atlantic plant is now being more than doubled in size. The original plant was constructed in 1939 and was expected to be adequate for at least two decades. However, the increase in business and continued demand for electrical equipment made by U. S. Motors has necessitated this

expansion program.

With the completion of the expansion program, U. S. Motors will manufacture motors used east of the Mississippi River in the Milford plant. Construction is now under way and it is expected that the enlarged facilities will be completed by next June. There will be no interruption of manufacturing during the expansion, according to F. M. Mason, vice-president and general manager.

**PHILLIPS *New Model 24*
Electric VAPOR DEGREASERS**

*Unsurpassed for
Performance
Unbeatable
for Price...*

\$295⁰⁰

PHILLIPS MANUFACTURING CO.

3455 Touhy Ave.

Chicago 45, Illinois



**RECLAIMS OWN SOLVENT!
COMPLETE, READY TO OPERATE!
AUTOMATIC CONTROLS!
LOWEST OPERATING COST!**



You NEED these TWO Machines

For a Full Range of Tool-
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LOW COST — EFFICIENT — LABOR SAVING

◀ **The MILWAUKEE Die Filer**
The MILWAUKEE Profile Grinder ▶

PRICE PUMP & MACHINE CO.

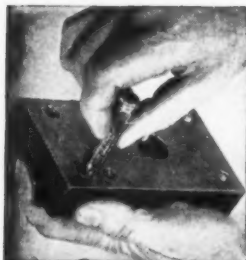
Division of Milwaukee Chaplet & Mfg. Co.
1027 S. 40th ST. MILWAUKEE 4, WIS.



Write for
Bulletins

MILWAUKEE

**DIE FILERS
PROFILE GRINDERS**



A REAL HELPING HAND

It's a help that die makers, tool makers, machinery builders and general machinists have long sought—a more accurate and surprisingly faster way of transferring blind screw holes.



The Heimann Transfer Screw Set is a self-contained, complete tool. No wrenches or pliers are necessary. Made in $\frac{1}{4}$ " to 1" diameters. Send for price list.

HEIMANN MFG. CO.

332 Lincoln Ave.

Urbana, Ohio

MACHINISTS—TOOL AND DIE MEN—SHEET METAL WORKERS—ETC.

FREE SAMPLE BLUE LAYOUT DOPE

STAYS PUT EVEN UNDER WET MACHINING!

Speeds layout on all metals. Dries fast. Oil resistant. Won't chip, crack or flake off. Comes in handy 8 oz. brush-in cans, pts., qts., drums. Order now!

TAMMS SILICA COMPANY
228 N. LaSalle St., Chicago 1, Ill.



Plain Type

CLOSED

TRADE

AUTOM

CLOSED

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CONTINUOUS HINGES

All hinges shown can be furnished with special holes, cutouts and bends to blue-print in metals to suit the job.

THREE-FOURTHS OFFSET.

**AUTO MOULDING
& MFG. CO.**

**1110 E. 87TH ST.
CHICAGO 19, ILL.**

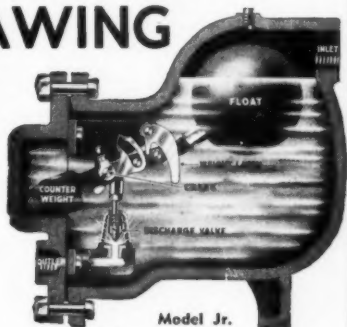
SPECIFICATIONS:
Open Width $\frac{1}{8}$ " to 6"
Gate Material .040 to .125
Pin Diameter .101 to $\frac{1}{16}$ "
Lengths to 120"

SEMI-OFFSET

SPEED DRAINAGE of Intercoolers,
Aftercoolers, Receivers with Nicholson

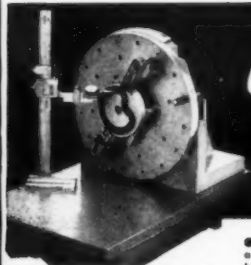
NON-WIRE-DRAWING AIR TRAPS

Valve opens wide instantaneously to discharge water and oil, after which it closes tight — instantaneously. Another trouble-proof feature is the positive fluid seal against loss of air. Easily connected. 3 types for every industrial application; all pressures to 1500 lbs. BULLETIN 341.



Model Jr.

W. H. NICHOLSON & CO. 117 Oregon St., Wilkes-Barre, Pa.



THE INDEXMASTER, made in 5", 7" and 10" diameters. Speeds layout and inspection of irregular and splined shapes, dies, cams, jigs and fixtures.

Makes the Sine Bar obsolete!

U. S. Pat. No. 2324476



Cut Inspection Time!

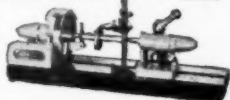
Save 2000 Manhours Annually
with the New Cleveland Republic
INDEXMASTER

● No matter what you make — when ultra-accurate layout and inspection are involved — you can turn out more production at low cost with the Indexmaster. One leading manufacturer states: "Its simplified operation has saved us over 2000 manhours in the past year." Permits even semi-skilled mechanics to perform the most critical inspection in a fraction of the time normally required. Uses standard J-blocks on precision built, fast-working indexplate and rugged base. Compact, portable, ready for instant use.

THE UNIVERSAL MODEL

Features bench centers for many time-saving, cost-saving uses, such as high-speed inspection of cam shafts, gears on shafts and other centered items. Has 7" swing, 19 1/2" centers. Weight: 100 lbs.

ASK YOUR DISTRIBUTOR FOR FULL DETAILS OR WRITE THE ADDRESS BELOW



Victory Booth No. 1218
A. S. T. E. EXHIBITION
Cleveland Public Auditorium
March 15th to 19th
U. S. Pat. No.
2324476

CLEVELAND REPUBLIC TOOL CORPORATION

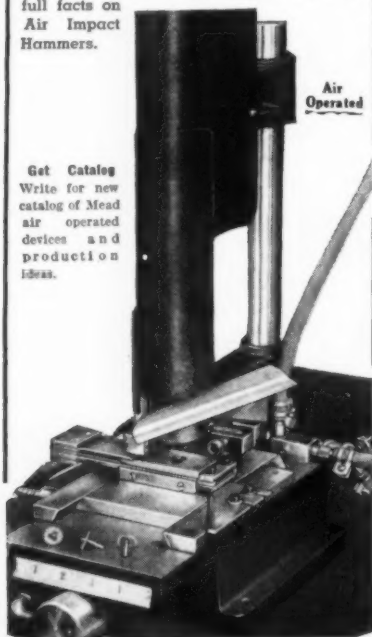
Sales Office: 1265 UNION COMMERCE BLDG., Cherry 1927 • Main Plant: 9615 MEECH AVE., Diamond 7900

CLEVELAND, OHIO

HOW to Flake a Gear on a Shaft with **AIR IMPACT HAMMER**

Vertical hopper moves forward on dovetail slide to work station, releasing hammer blow. Spring-return motion rejects assembled parts through diagonal chute . . . 2500 per hour. Complete cycle follows one touch of foot valve. Write for full facts on Air Impact Hammers.

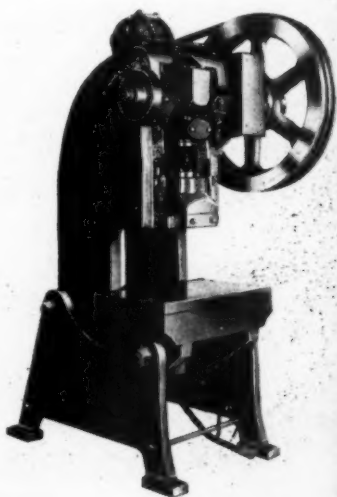
Get Catalog
Write for new catalog of Mead air operated devices and production ideas.



MEAD SPECIALTIES CO.
4114 N. Knox Ave., Chicago 41, Ill.
Dept. YA-48

PUNCH PRESS WITH SELF-ENERGIZED BRAKE

A new steel-welded punch press in 70 and 100-ton capacities has been introduced by the Superior Punch Press Co. Its outstanding feature is the energized brake, which is applied only at the moment of clutch disengagement. The braking increases in pressure until the crankshaft reaches zero speed. The brake action is synchronized with the clutch; when the clutch engages, the brake disengages, and remains free while the press is in motion.

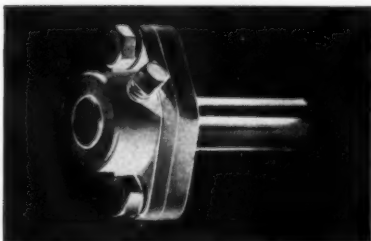


The clutch is cam controlled. No pins are used, as the cam is mounted on the crankshaft which works the throwout yokes, resulting in a positive clutch action. The 70-ton press main bearings are 4½; connection bearing, 6" standard stroke is 3½" (longer stroke can be furnished), and the bolster plate measures 22" x 32". For complete information, and technical data, write:

The Superior Punch Press Co.,
3610 Superior Ave., Dept. BB
Cleveland, Ohio.

PO-RO TOOL HOLDER CONSISTS OF PRECISION-MADE PARTS

Advanced methods in the design and production of the new Po-Ro Floating Tool Holder have made it a unique device of its type, according to Podlin Tool Co., Chicago manufacturers of tools, dies, and experimental work. This




tool holder is made from screw machine parts and punch press stampings, instead of the customary drop forgings. The parts are fused by copper brazing,

forming a rugged, solid unit; this construction eliminates the hazard of stresses and strains encountered in forgings and castings. The Po-Ro holder retains its original, accurately ground surfaces indefinitely. All component parts are heat-treated, better to withstand the abuse of heavy production runs.

The Po-Ro Holder may be used to advantage in centering cutting tools (drills, reamers, taps, etc.) for work on automatic screw machines. The tool is held directly in the head of the holder, or by use of a bushing held in place with a set screw. The Po-Ro Holder is available in three sizes, No. 00, No. 0, and No. 2, with $\frac{1}{2}$ ", $\frac{5}{8}$ ", and 1" inside diameter sizes, respectively. Overall lengths are 4-1/16", 5-3/16", and 6 3/8". For complete data, write:

Podlin Tool Co., Dept. BB
5349 W. School St.
Chicago 41, Ill.




SAFETY WORK-STOP

for drill presses

Easily installed
and operated

Pull to work
it's locked—

Any angle



Stop No.	Width (Table)	Depth	F. O. B. s.p.	Weight
1 B	12 - 16	10 - 16	13.95	6 lbs.
2 B	16 - 24	16 - 24	15.95	8 lbs.
3 B	24 - 30	24 - 30	17.95	10 lbs.

KAY MANUFACTURING CO.
Columbus, Indiana

NEW COATING PROTECTS SURFACES FROM MOISTURE AND CHEMICAL CORROSION

Metal, wood, leather and fabric surfaces can now be protected from corrosion and deterioration by a new transparent liquid "skin" which is being introduced by its manufacturer, State Chemical Corp.

Called Permacote, the new protective coating was designed for use on surfaces which require protection from moisture, acids, alkalis, alcohol, dyes, dirt, dust, etc. It can be applied by brush, spray or dip, and forms a tough, transparent coating which remains permanently flexible and is highly resistant to abuse by either physical or chemical means. The product is also resistant to extremes of heat or cold and will not crack or chip in spite of the expansion or contraction of the surface it protects. The coating imparts a lustre to any surface it is applied to and effectively seals in and prolongs the life of ordinary paints, lacquers and varnishes. For details, write:

State Chemical Corp., Dept. BB
1265 Broadway
New York 1, N. Y.



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states Manufacturer
since installing
GITS
MULTIPLE
OILERS

Atlas-Boxmakers, Inc., Chicago, Ill., writes: "Wish to commend you on the quality of your automatic multiple oilers. Prior to their installation on our . . . press, at least once each day the press would freeze due to insufficient oil. Since the installation of these oilers the press has not been shut down at any time due to lack of oil to the component parts fed by your multiple oilers."

Manufacturers everywhere are installing GITS centralized oiling systems—for guaranteed lubrication and reduced maintenance. Let us tell you this GITS story!

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1860 S. Kilbourn Ave., Chicago 23, Illinois

Exclusive for over 40 years

**ENGINEERING VITAL FORCE
IN BUILDING BETTER WORLD**

A realistic view by the engineering profession of the potentialities of atomic power was urged by E.E. Johnson, manager of Engineering of General Electric's Apparatus Department, Schenectady 5, N. Y., in a series of recent addresses on "Electric Horizons" before several Southwestern engineering groups.

Some predictions for nuclear power were termed "fantastic" and "exaggerated" by Mr. Johnson, who said that one of the most important things to consider

was that applications to be used near human beings must have a very heavy shield. This rules out use in automobiles, aircraft, and even locomotives, he added.

The G-E executive said that the two most likely developments in the constructive use of atomic power will be large land power plants and ship propulsion plants. Use in naval vessels was foreseen in view of the fact that enough lightweight fuel could be carried to drive a ship several times around the world at full speed. In any case, Mr. Johnson said, nuclear fuel must compete with coal and oil on a cost basis.

Emphasizing the fact that "there will always be something new in engineering", Mr. Johnson asserted that the possibilities in the universe are unlimited.

As an example of this vast scope, Mr. Johnson outlined the expanding variety of engineering fields in which

General Electric is working, including chemical, metallurgical, electronics, medical, aeronautical, and, the most recent, nucleonics.

He pointed to two extremes of the company's endeavours. One is experimentation on the V-2 rocket, which was characterized as a 500,000 horsepower, one-unit power plant. As the other extreme, he mentioned glass instrument bearings so small that several hundred can be placed in a spoon. He said that engineering is a sociological force which too must be harnessed.

NEW CLEEREMAN MACHINE A VERSATILE UNIT

The recently developed Cleereman Sliding Head Drilling Machine, Model 325, supplements and extends the Cleereman line by providing a unit which combines sensitivity with strength; it is adaptable to a wide variety of manufacturing operations.



Its features include an enclosed single unit sliding head which houses the spindle and feed mechanisms, motor, and spindle speed transmission. All electrical equipment and controls are normally on the sliding head. The machine has single lever functional control with six geared spindle speed changes on one lever and four feed rates on another. All controls are located within a small area for convenience. Direct action feed clutch engagement, a positive feed depth stop and a sensitive spindle of great rigidity are provided.

For complete details, write to the exclusive general distributors of all Cleereman machine tools:

Bryant Machinery & Engineering Co.
400 W. Madison St., Dept. BB
Chicago 6, Ill.

FOR BETTER FORM-TOOLS

send
your specs
to
J&S



● Long experience in the production of accurate Form-Tools has enabled us to develop methods and equipment that reduce man-hours. We pass these savings along to our customers. For the high quality of workmanship, our prices are unusually attractive. Send us your specs and see for yourself.

Boring tools, circular form tools, carbide form tools, counterbores, end cutters, flat drills, gun drills, hollow mills, recess tools, spiral form tools, step drills, taper reamers, watch tools, etc.

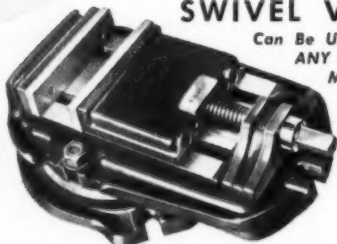
J&S TOOL CO., INC.

471 Main Street, East Orange, N. J.
Representatives in Principal Cities

CUT MILLING COSTS *with* KEMPSMITH STANDARD ATTACHMENTS

SWIVEL VISE

Can Be Used on
ANY Milling
Machine



Kempsmith Swivel Vises are precision tools with operating surfaces accurately ground to size and squareness. Jaws are removable and coolant return channel cast integral. Built to take hard, everyday punishment. Plain vises and heavy duty plain and swivel vises, also available. Ask for Bulletin No. 117.

Kempsmith Standard Attachments broaden the scope of your milling machine . . . lower capital investment . . . save in set-up time.

KEMPSMITH MACHINE CO.
1827 SOUTH 71st STREET
MILWAUKEE 14, WIS., U. S. A.

KEMPSMITH

Precision Built Milling Machines Since 1888

BRAND NAMES BUILD CONFIDENCE IN CONSUMER AND INDUSTRIAL FIELDS

"Advertising of toothpaste or steel, alike, is designed to build knowledge, confidence and desire; and in both instances, of these three, confidence is the most important," Henry E. Abt, president of the Brand Names Foundation, Inc., 119 W. 57th St., N. Y. 19, told members of the Chicago Industrial Advertisers' Association at a dinner meeting in Chicago.

Discussing the similarity of aims in both consumer and industrial advertising, in an address entitled, "Are Consumer



KEMPSMITH ARBORS

in all popular
sizes or types.
Adaptable to
ANY make of
milling ma-
chine with
standardized
spindle.

and Industrial Advertising So Different?" Abt called "confidence in a source, a reputation, a name or trade - mark" the most enduring accomplishment of each field.

Mr. Abt cited the comparative lack of brand-identification in the industrial field, contrasted this with the wholesale application of the brand names principle in the consumer goods field. "The marketer of the wares we buy for our homes," he said, "usually recognizes this fact in the way he features his trademark in advertising copy and on his package or products itself. He organizes his whole business to advance his trademark."

In suggesting the greater use of brand - identification of products in the industrial field, Mr. Abt cited three areas in which trade - mark advancement plays a valuable role.

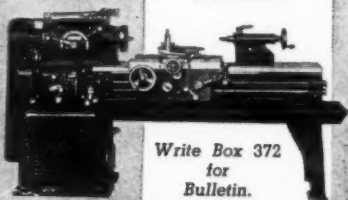
The first area he cited "comes with the realization that advertising relates not only to tomorrow's sales, but also to the ultimate atmosphere in which the salesman's presentation or bid is received." The second, Mr. Abt described as including "those products which are intermediate aspects—which contribute something to products used by the consumer."

Mr. Abt designated the field of employer-employee relations as the third area, and described trade-marks and brands as representatives of qualities and general policies which can be a source of pride to all employees.

CARROLL AND JAMIESON LATHES 15" AND 16"

12 Speed Geared
Head Motor Drive
Timken Mounted
Spindle

Modern Design—
Liberal
Dimensions



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for
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THE CARROLL & JAMIESON
MACHINE TOOL CO.

DAYTON, OHIO, U. S. A.

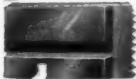
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TO FIT THE LANDIS,
GEOMETRIC, Murchey,
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QUALITY CHASER
OFFERS YOU:

1. Master Workmanship.
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3. Longer Threading Life.
4. Standard sizes from stock.
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SELL FOR LESS



QUALITY
CHASER CO.

WRITE FOR FOLDER

24000 Stephenson Hwy
HAZEL PARK, MICH.



STOP EYE FATIGUE

AND COSTLY
REJECTS... *use*

VIMCOLIGHTS



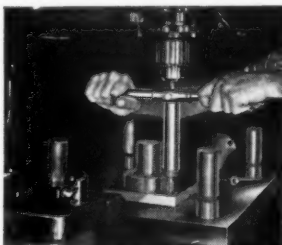
on your machines. Makers of many famous machines use them because—well designed flexible arm with ball socket angles light on work area and holds it steady—installation takes only a minute—modern appearance—attractive finish—cost reasonable.

Climax Mfg. Co.
asked for Vimco
Folder 74. See
result at left.
Write for your
copy.

VIMCO MFG. COMPANY, Inc.
109 Baynton St. Buffalo 13, N. Y.

THE NEW LASSY UNIVERSAL TAP GUIDE

For use in Drill Press, Lathe or as an extension Tap Wrench. Uses same tap adapters which are interchangeable on all Lassy Tappers and Threaders. Has hollow handles and spindle for lightness and tap "feel".

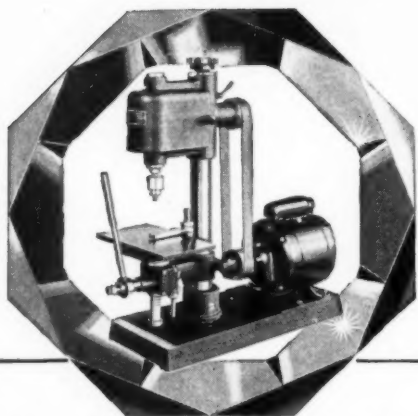


\$18.75
Less
Adapters

Above the Lassy Tap Guide is being used on the Moore Die Flipper for which it is standard equipment.

Write for literature to:

LASSY TOOL COMPANY
108 Bohemia Street Plainville, Conn.
Makers of Lassy Bench and Floor Tappers



PRECISION INSTRUMENT TAPPER

THE HAMILTON SUPER-SENSITIVE TAPPING MACHINE

Designed to meet the most exacting requirements of precision manufacturers. Patented power transmission permits centering of tap without cutting, and tapping to the very bottom of blind holes without tap breakage. Capacity from the smallest and finest tap to 10-32 inclusive. Silent and clean in operation. Our Bulletin T-47 gives full specifications. Write for it today!



THE
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SUPER SENSITIVE DRILLING MACHINES
TAPPING MACHINES • PORTALVATORS

TOOL COMPANY

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SOUTHERN MACHINERY SHOW FEATURES STREAMLINED MANUFACTURING IDEAS

Keen interest is being manifested in the Third Southern Machinery and Metals Exposition by top management, plant superintendents, plant engineers, production managers, purchasing agents, foremen and plant personnel. This year's show will feature methods for streamlining manufacturing operations, reducing costs and improving quality and production.

Many companies that have not heretofore displayed their products in a major Southern industrial Exposition are in-

cluded in the growing list of exhibitors from throughout America, reports Alva S. Wilson, Exposition President. Southern companies will display many new products, and national manufacturers will exhibit the latest equipment from continuous cutting saws to materials handling equipment.

Georgia Tech, in conjunction with Southern Technical Societies, will conduct the Southern Industrial Conference on Machinery and Metals, concurrently with the Exposition. The general topics for discussion at the Conference will include: "Machining of Ferrous Metals" and "Machining of Non-ferrous Metals," sponsored by the Georgia Chapter of the American Society for Metals; "Practical Engineering of Jigs and Fixtures" and "Interchangeability," sponsored by the Atlanta Chapter of the American Society of Tool Engineers; "Machine Design,"

sponsored by the Atlanta Section, American Society of Mechanical Engineers; and "Production," sponsored by the Atlanta Section, Society for the Advancement of Management.

Motion pictures of the latest industrial processes, applications and manufacturing methods will be shown at the Exposition Theatre in the Atlanta Municipal Auditorium. There will be a continuous showing throughout the four-day show.

Those desiring information on exhibit space and other data should write the Exposition office, at 267 East Paces Ferry Rd., N.E., Atlanta 5, Ga.

NEW INDEX MILLER HAS WIDE WORKING CAPACITY

The Index Machine Co., announce their new Model 50 High Speed Vertical Milling Machine. The unit is of rigid construction. A quick change full-geared table feed mechanism delivers power to the table through a splined feed shaft eliminating the key-way of the lead screw, thus increasing the machine's precision and sensitive operation.



For precision punching of shim stock up to .025, also rubber, fibre, paper and plastic, the new **TRANSPARENT Shim Stock Punch** provides an easy and economical answer.

ACCURATE ALIGNMENT is assured because the clear plastic top enables the operator to actually see the work. Overall size: $1\frac{1}{2}'' \times 3'' \times 3\frac{1}{2}''$, which provides for the following standard size holes: $\frac{1}{8}''$, $3/16''$, $\frac{1}{4}''$, $5/16''$, $3/8''$, $7/16''$, $\frac{1}{2}''$, $9/16''$, and $3/4''$. Special sizes built to your specifications. Write today for full details . . . and begin to enjoy the advantages which only the **TRANSPARENT Shim Stock Punch** can give your plant.

ALLIED TOOL & DIE CO.
305 N. Baum St., Saginaw, Mich.

Featured is the right angle milling head which handles horizontal milling operations of every type including boring and drilling. The compact head unit makes the change-over from vertical to angle milling in a few seconds. The unit can also be used as a cutting arbor or tool holder. For full information write:

The Index Machine Co., Dept. BB
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Jackson, Mich.

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FOR ALL LATHES OLD OR
NEW — 9" to 24" swing
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MASTER TAPER COMPANY
126 N. Clinton St. Chicago 6, Ill.
Exclusive Mfrs. of Taper Attachments

"T" SURFACE GRINDER

Proven Performance—Since 1935

DIVERSIFIED USES:

Precision surface grinding
Chip breaker grinding & sharpening
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Sharpening form tools
Thread chaser grinding
Sharpening circular file chisels

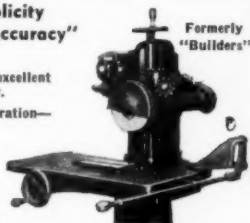
"Its Simplicity
Insures Its Accuracy"

Lever operation produces excellent
finish with unusual accuracy.
Soundly constructed—no vibration—
heavy stock removal.

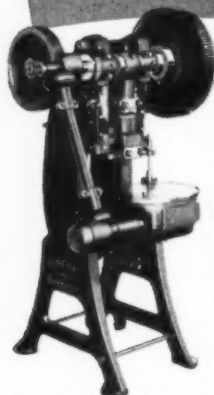
"SOLD ALL OVER
THE WORLD"

WRITE FOR BULLETIN

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THESE *dial feed* PRESSES



Available in 8 sizes—
Capacity 6 to 80 tons

- ◆ STEP UP PRODUCTION 3 TO 6 TIMES
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- ◆ MAKE HIGH SPEED OPERATION SAFE

Federal Dial Feeds are known for fast, safe, smooth operation—capable of producing scores of items which formerly required special machinery of limited utility. High speed, greater accuracy, reduced maintenance can save up to 75% in production costs depending on type of work. Built to withstand hardest usage, Federal Dial Feeds may be the answer to your production problem. Write today for catalog on complete line.

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FEDERAL *Dial Feed* PRESSES

APRIL 22 AND 23 SET FOR WESTINGHOUSE FORUM

The 1948 Westinghouse Machine Tool Electrification Forum will be held in Buffalo, New York on April 22nd and 23rd. The first day's session will convene in the Niagara Room of the Hotel Statler; the second day's session in the Auditorium of the Buffalo plant of Westinghouse.

The keynote of this year's Forum will be "Control." Speakers at the morning session will be: Kermit Kuch of Monarch Machine Tool Co., Sydney, Ohio—"Electronic Lathe Controls;" R. J. Teetsell,

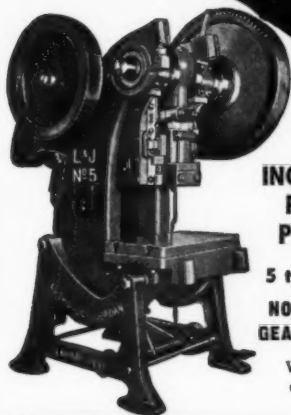
Westinghouse Electric Corp., Pittsburgh, Pa.—"Application of Instruments to Machine Tools;" E. P. Bullard III, Bullard Co., Bridgeport, Conn.—"A Recent Development in Automatic Lathe Control."

Afternoon papers will be given by J. J. Jaeger of Pratt & Whitney Div., Hartford, Conn.—"Control Problems in Keller Machine;" Royce Johnson of Barber Coleman Co., Rockford, Ill.—"Oscillographic Performance Analysis of Automatic Tool Sharpener;" Myron S. Curtis of Warner & Swasey Co., Cleveland, Ohio—"Turning Points in the Metal Working Industry." The final paper on the first day will be a "Report of the National Machine Tool Builders' Association Electrical Committee." W. B. Wigdon, Electrical Engineer, Cincinnati Planer Co., Cincinnati, Ohio, is chairman of this committee and will act as chairman of this part of the program.

Discussions on the second day include G. H. Welch of Westinghouse—"Resume of Control Production Facilities and Plans for the Future;" G. A. Caldwell, Westinghouse—"Electronic Motor Control," accompanied by an actual demonstration; and L. W. Herchenroeder, Westinghouse—"Selecting D-C Power Sources for Machine Tools."

The afternoon's session will include plant tours and Tell Berna, general manager, National Machine Tool Builders' Association, will present his "Report on the Machine Tool Industry."

Standard Since 1911



INCLINABLE POWER PRESSES

5 to 79 tons
NO. 5 BACK
GEARED TYPE

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catalog.

L & J PRESS CORP.

SUCCESSORS TO Lathbough-Jordan Tool & Machine Co.
1825 STERLING AVE. ELKHART, INDIANA

A NEW Swivel Conveyor HOOK

Automatic or
Hand Indexing
adaptable to
overhead chain
and Monorail
Conveyors

SPECIAL HOOKS
ENGINEERED TO
MEET YOUR
REQUIREMENTS



CONNER TOOL & DIE CO.

424 NORTH PARK ST.
GRAND RAPIDS • MICHIGAN



SAVE Labor and Time

Eliminate
heavy lifting.
Cut handling
costs. Table

swivels and locks in any position. Can be varied 15½" by slight foot pressure, leaving operator's hands free. Engineered and built by tool engineers, experienced in production of special machines, dies, jigs and fixtures for exacting requirements.

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MARVECO LIVE CENTERS

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- LONG LIFE
- HEAVY DUTY



MARVECO. guaranteed to outperform and outlast any other live center. Write for free catalog, "The Marvels of Marveco."

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SIGOURNEY M-100

MAINTAINED ACCURACY

IN PRECISION WORK

The Sigourney M-100 Bench Drilling Machine is extremely accurate on precision jobs. It is unusually sturdy and rigid in construction . . . has hardened and ground spindles . . . and sealed ball bearings throughout. All moving parts are entirely closed for maximum operator safety.

M-100 is built for long and steady service.

This sturdily constructed bench drilling machine is available in 1, 2, 3 and 4 spindle models . . . speeds from 4,000 to 10,000 r.p.m.

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West Hartford, Connecticut

PROPOSE LOAN OF PROFESSIONAL CONSULTANTS TO EUROPEAN PLANTS

A plan to volunteer the services of American industry's top executives and technical experts to Western European nations for the purpose of improving their manufacturing methods and processes and stepping up production abroad is being advocated in Washington by Roy W. Gifford, Chairman of the Board of Borg-Warner International Corp., Chicago, Ill.

Mr. Gifford proposes that the industries of America unite in an Industrial Council for European Aid. It would be

not be forced upon any foreign industry or individual company but would be available if such aid were requested through the proper channels.

"It should be the aim and to the advantage of both lender and borrowers to keep the actual outlay for European aid at the lowest possible figure," Mr. Gifford said. "The program which I suggest should take the form of an offer made by organized American industry to organized European industry. The results thus obtained would be greater and the expense far less. And the American taxpayer would be relieved more quickly."

the purpose of the Council to prepare itself to loan the services of key personnel as consultants to European industries and to individual European companies requesting such assistance. These advisors would seek to increase productivity per man, modernize plants and generally better working conditions. They would be called upon to study and improve such diverse methods and processes as the use of new machine tools metallurgy, manufacturing controls, materials handling, marketing and distribution.

These consultants would be loaned for periods sufficiently long to adopt American techniques to the plants employing their services. Aid of this type of course could



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VALVES****SAFER
FASTER
PRODUCTION**

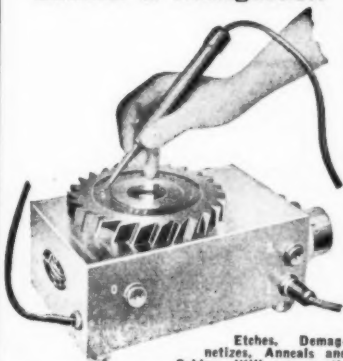
LITTELL Air-Blast Valve automatically ejects pieces from punch presses. Keeps operator's hand out of danger zone. Increases safety and speed. Air nozzle quickly adjustable.

Other Littell safety devices include Pres-Vac Safety Feeders for picking up and feeding flat-surfaced materials; also, air-operated Mechanical Pickers for feeding pieces that vacuum lift will not pick up.

Littell makes a complete line of Automatic Reels, Feeds, Straighteners, REQUEST Scrap Cutters, etc. **BULLETINS**

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4153 Ravenswood Ave., Chicago 13, Ill.

**L U M A Combination
Etchtool & Demagnetizer**

Etches, Demagnetizes, Anneals and Solders. Will permanently mark hardest steel with ease of a fountain pen. Etch and Demagnetize in same operation or separately. Write for details.

LUMA ELECTRIC EQPT. CO.

P. O. Box 132-H

Toledo 1, Ohio

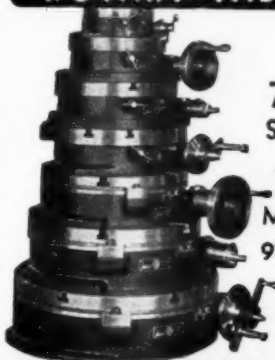
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working
drawings***in the new book***Illustrated JIG-
TOOLING DICTIONARY**

graphically demonstrate the construction and use of all basic tooling equipment, including many machine tool, welding, diemaking, plastic molding, drafting and other allied terms and procedures.

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THE MACMILLAN COMPANY

60 Fifth Avenue, New York 11

**SAVES
TOOL MAKERS' TIME
T R O Y K E
ROTARY TABLE****7
SIZES****10
MODELS
9" to 25"**

Catalog on request

TROYKE MFG. CO.

4422 Appleton St., Cincinnati 9, Ohio

**THEY
STAND
ABUSE!**



These
"EDUCATED DIAMONDS"
can't come loose!

How would you like a dresser that really holds its diamonds?

Here's one that will do it—thanks to its matrix of Carboloy Cemented Carbide.

What's more, this special carbide matrix makes it possible to use small, inexpensive diamonds—and you get the savings.

Are you interested in savings of up to 40% in your dressing costs? Let us send you our free brochure, "The More Profitable Use of Diamonds for Dressing Grinding Wheels." Ask for brochure No. DR-480. Carboloy Company, 11139 E. 8 Mile Street, Detroit 32, Mich.



DIAMOND DRESSERS

by **CARBOLLOY®**

**QUALITY CONTROL TECHNIQUES
CAN HELP DEFEAT INFLATION**

Scientific methods of production quality control, widely applied during the war, can be one of industry's most effective weapons in the fight against inflation, according to Jerome R. Steen, director of quality control, Sylvania Electric Products Inc., 500 5th Ave., N.Y.

Extension of the basic wartime method, he said, tends to improve quality and reduce shrinkage of parts all along the production line. This effectively increases production by reducing wastage

of still scarce or expensive material as well as worker effort. The important thing, Steen stressed, is the application of statistical methods and principles to the maximum number of manufacturing processes.

The technique, he explained, revolutionizes the old-time concept of inspecting defects "out" of a product as an answer to the need for maintaining quality. The older method, he said, cannot assure quality in the post-war sense, since it does not build quality into every manufacturing step by checking the results of many processes.

A greater application of the laws of probability, he continued, shows that quality specifications of unnecessarily close limits are required. This tends toward needless wastage of labor and materials and does not increase the true quality of the finished product.

In contrast with modern quality

methods, the old method examined the strong links in the manufacturing chain without regard to flaws in weaker links. Workers were accused of poor workmanship beyond their control, with resultant lowering of worker morale.

Modern quality control techniques, he said, greatly reduce emotional tension between worker and inspector by giving workers acceptable material to work with and crediting them with the quality they add to it. Teamwork is created between the quality control engineer and the employee at the machine or bench.

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Gears

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ONE OR A MILLION

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metallic and non-metallic

1/4 TO 72 INCHES in DIAMETER

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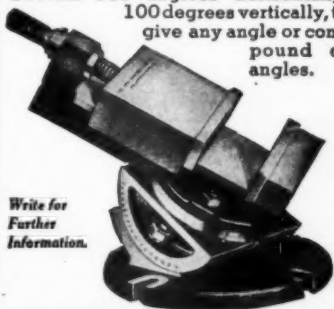
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ROUND THE CLOCK SERVICE

New Britain UNIVERSAL VISE

THE ORIGINAL

Swivels 360 degrees horizontally,
100 degrees vertically, to
give any angle or com-
pound of
angles.



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Further
Information.

NEW BRITAIN TOOL & MFG. CO.
NEW BRITAIN, CONN., U. S. A.

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RIVETERS

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you
the
utmost
in
RIVETING
ECONOMY

AVAILABLE:
in Noiseless Spinning and
Vibration Hammer types.
Also Vertical and Horizontal
Multiple Spindle Spinning
Machines. Write for litera-
ture and don't forget to
send samples.

THE GRANT MFG. & MACHINE CO.
C E Station, Bridgeport 5, Conn.

**DOWEL
PINS**

Immediate Delivery!

Standard Size Dowel Pins from
1/8" to 1" diameter and from
3/8" to 6" length supplied in
.0002 and .001 over basic sizes.
Unless otherwise specified, .0002
oversize will be furnished.

SCHULTZ & ANDERSON CO.

109 Edison Place, Newark 5, N. J.

Save Labor

with

TOP SPEED

MILLING



No. 1-14... 32" by 9"
table... 14" table travel
...hydraulic table feed
...full automatic cycle.
Rugged...simple...effi-
cient...adaptable to a
wide range of work.
Write for latest bullet-
ins on complete line.
Kent-Owens Machine
Company, Toledo, O.



Specify

KENT-OWENS

Milling Machines

PROFITS FROM IMPROVED

PACKAGING SEEN BY AMA COUNCIL

Lowered costs and increased profits from industrial and consumer packaging through economy of production, intensified sales appeal and increased consumer convenience will be the objective of the Conference on Packaging, Packing and Shipping sponsored by the American Management Association, 330 West 42nd St., N.Y., N.Y. This will be held in Cleveland, April 26 through 29, concurrently with the Association's 17th annual Packaging Exposition.

This goal for Packaging Week was

announced by AMA following a meeting of the Association's Packaging Council whose 22 members represent both producers and users of packaging.

Reduced costs without a reduction in packaging standards are necessary, the Council agreed, to meet increasing competition. They can be achieved, according to the Council, by new applications and better management of existing techniques and development of new methods which simplify production, facilitate physical handling during distribution, increase sales appeal through appearance and improve merchandising.

"The manufacturer who is looking at his competitive position in this light and who is prepared to take action, has a definite edge over his competitor," E. A. Throckmorton, Jr., AMA Packaging vice president and president, Container Laboratories,

Inc., Chicago stated.

Discussions at the conference, which will be attended by more than 2,000 packaging executives and specialists, will stress new uses of glass, metals, paper, paperboard and wood for packing and shipping products of all types and sizes. They will also emphasize improved warehousing methods and techniques, packaging of perishable agricultural products, effective and economical methods of printing, the maintenance of packaging machinery, simplification of packing specifications, interior packing, heat labelling and the prevention of damage in transit.

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FOR WHEEL DRESSING TOOLS

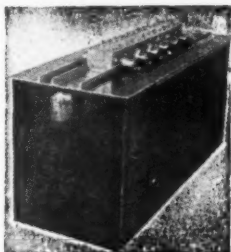
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DIAMONDS
FOR ALL INDUSTRIAL PURPOSES

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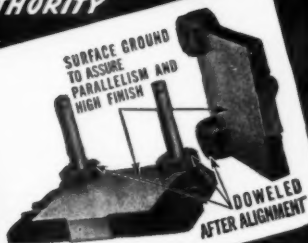


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By John E. Hylor

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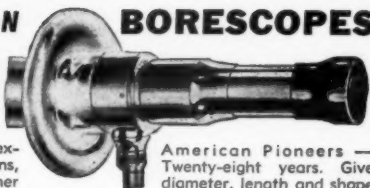
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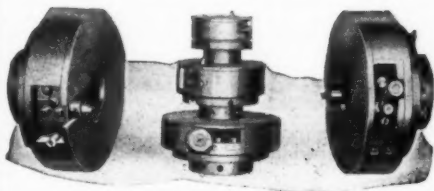
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They report that the American Road Builders' Association is training Latin American engineers in highway construction and maintenance.

The men had experience in highway construction and the course presented to each individual was designed to supplement his past training.

This course was so successful that the Office of Inter-American Affairs invited the Association to take on a broader training program. The United States Department of State, the Public Roads Administration and the Pan American Highway Confederation all cooperated to start the program and plan it.

The Association familiarized twenty highway engineers and construction men with American highway equipment, materials, methods, maintenance, operation and construction, so that when they returned to their respective countries, they could apply the knowledge so obtained to native roads and highways.

The "Reporter" states that "The program, as finally evolved, called for a short period of housing and orientation and a series of lectures, held in Washington, D.C.; a study and inspection tour that took seven weeks and visited six states; individual assignments in various parts of the country; a short course in traffic control at Yale University; and finally, evaluation and appraisal, back in Washington, the whole course lasting a year.

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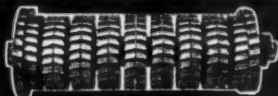
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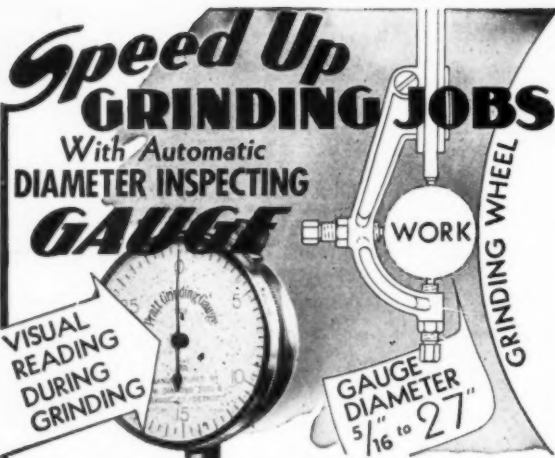
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According to "Steel Facts," by American Iron and Steel Institute, 350 5th Ave., N. Y. 1, "The steel companies' current expansion programs, which include, according to a recently revised estimate, approximately 3,000,000 tons of new ingot-making capacity, are among the largest undertaken when war was neither in progress nor imminent. The cost of the current program is one billion dollars, a record for peacetime." Companies have increased ingot-making capacity in good and bad times, and in peace and war.

Send for Bulletin

Even during the depression period of 1930-1934, the industry increased its ingot capacity by almost a million tons more than the increase during the good period 1925-29.

The increase during the period of 1915-19 was "the largest expansion in any five-year period of the past three decades." Steel capacity was increased by 16,064,000 tons as against 12,251,000 tons for the period 1940-44.

"Net increases in capacity for the successive five-year periods were 16,064,000 tons from 1915-19; 6,159,000 tons from 1920-24; 4,512,000 tons from 1925-29; 5,466,000 tons from 1930-34; 3,167,000 tons from 1935-39; and 12,251,000 from 1940-44... In all cases, expansion during the five-year intervals offsets reductions in some years."

At the end of the war some steel companies withdrew from operation older facilities used during the

war, and "steel capacity on January 1, 1946 was reduced to 91,890,500 net tons. Capacity was further reduced to 91,241,230 on January 1, 1947. But... steel companies were pushing new programs designed to expand ingot capacity by over 3,000,000 tons."

Average annual expansion during 1915-1945 amounted to 1,553,000 net tons. Average expansion in ingot capacity for 1940-45 reached 2,314,000 net tons per year. "Steel companies' present programs will add about 3,000,000 tons of capacity each to blast furnaces, coke ovens and sheet and strip rolling mills."

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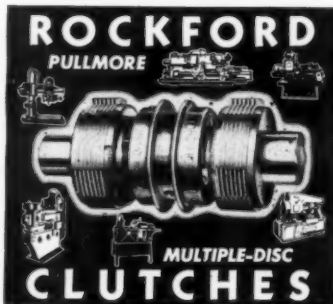
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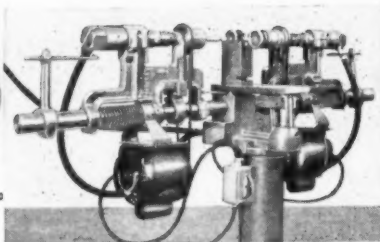


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ALUMINUM INDUSTRY SETS PEACETIME RECORD IN 1947

According to Roy A. Hunt, president, Aluminum Co. of America, 801 Gulf Bldg., Pittsburgh 19, Pa., the nation's aluminum industry topped all previous peacetime production records in 1947 and enjoyed greater growth and diversification than any comparable period in the last decade.

Mr. Hunt reports that production jumped about 39% in 1947 over 1946, but despite this, the supply tightened toward the end of the year. Shortages of steel and galvanized iron coupled with an increased demand for aluminum based on

increased in popularity. Additional applications in building construction which have shown noteworthy increases during the past year include heating and ventilating ducts and fittings; nails; screens; molding; thresholds, venetian blinds; awnings; storm doors and windows; garage doors; gutters and downspouts; and spandrels. The use of aluminum for commercial vehicles such as truck, bus and trailer units has shown a marked upswing and there is a strong trend toward aluminum in the passenger automobile field. Mr. Hunt expects 1948 to be a good year for aluminum.

its own merits accounted for the tight supply. Alcoa's large new mill for rolling sheet and plate aluminum, now under construction at Davenport, Iowa, will come into production shortly and will relieve the situation.

The distribution of Alcoa aluminum products by industries during 1947 continued to parallel, in general, the trends established in 1946, with building construction the leading consumer of the metal. Alcoa shipments to various industries during the year are estimated to be as follows: Building products 19%; transportation 15%; cooking utensils 9%; machinery 6%; household appliances 7%; power transmission 6%; shipments to fabricators for further processing 24%; all other 14%.

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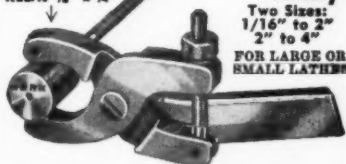
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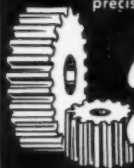
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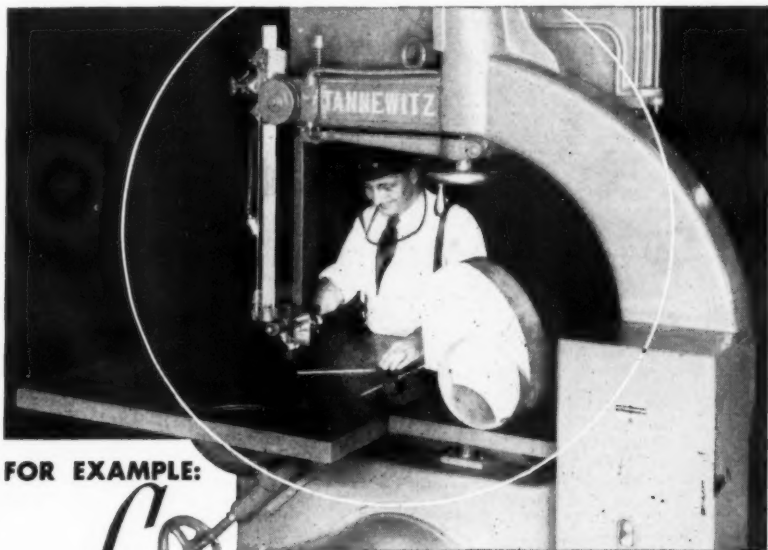


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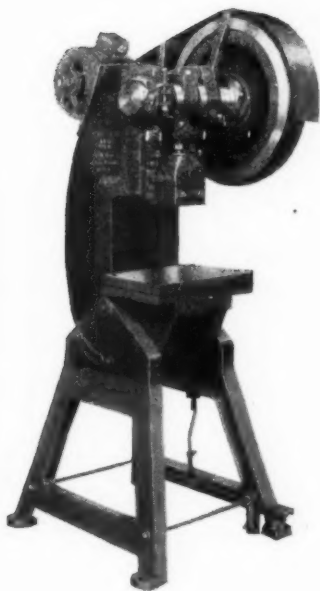
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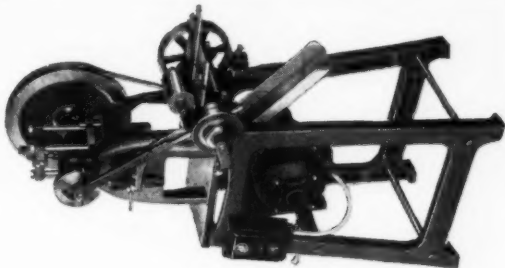
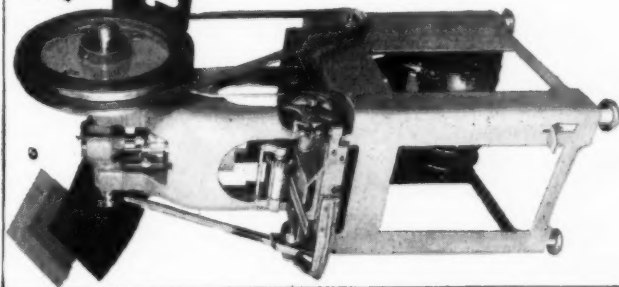
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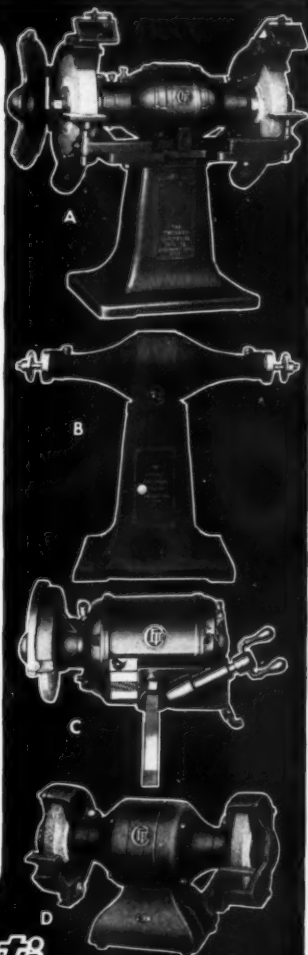
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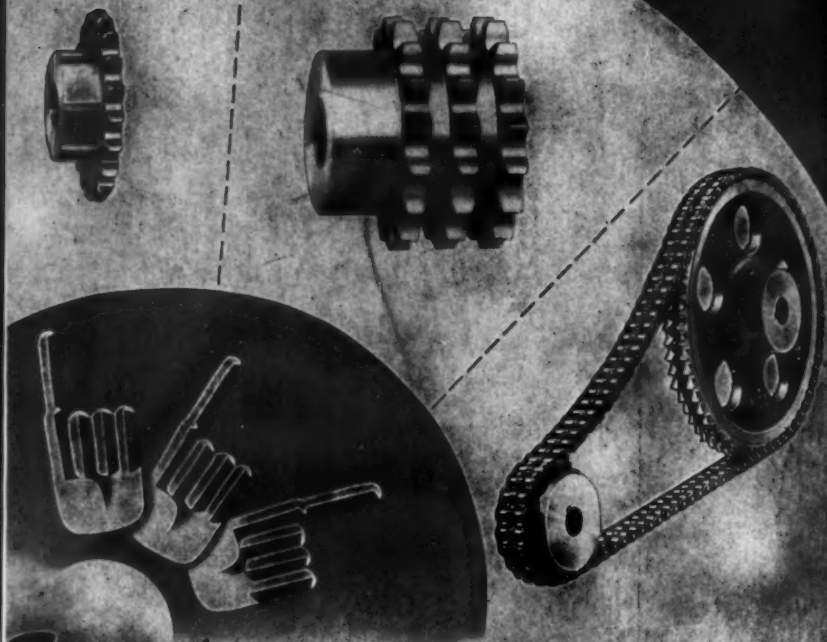


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